Southern California's Computer Magazine

November 28, 1994 • #130

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Neil Young & Liontech

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Fun And Games: The 2nd Annual Holiday Gift Guide

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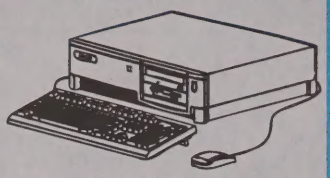

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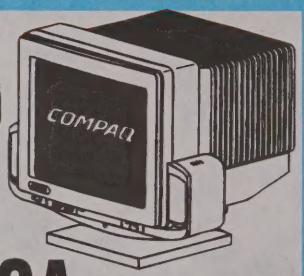

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COMPAQ 486DX2 40MHz
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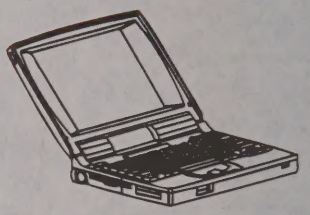

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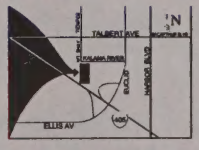

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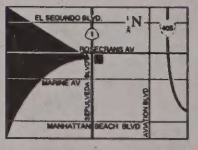

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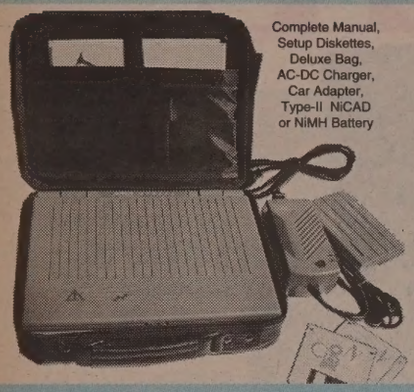

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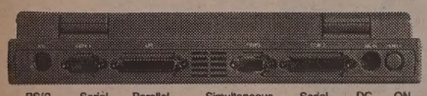

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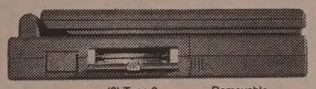
PCMCIA Slots (Left View)



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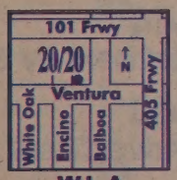

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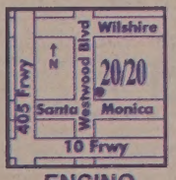

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MICROTIMES™

November 28, 1994 • Issue #130

Happy Holidays!

Welcome to our second annual Fun & Games issue, in which we take a break from our normal activities and enjoy the lighter side of the digital universe.

We hope you enjoy our visit with musician Neil Young, in which he talks about family fun and his efforts to make electric trains as exciting to new generations as they were to us Boomers and our forebears. We usually have fun doing our cover stories, but this one exceeded our expectations considerably.

This issue also includes lots of stories about products and activities for entertainment and home-office use, including a visit to Knowledge Adventure in La Crescenta to find out what's new in the world of interactive education.

Watch for our next special issue, the Annual California Dealers Guide, which will appear at a distribution site near you around December 14.

Once again, we've enjoyed the opportunity to bring you this magazine over the last year, and look forward to another year of further adventuers. All of us wish all of you the happiest of holidays and a very fine New Year.

—eds.

COVER STORY

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BY MARY EISENHART COVER PHOTO: ANNE KNUDSEN
Taking a break from rock 'n' roll, Neil Young talks about his own Silicon Valley Startup—Liontech, a joint venture with Richard Kughn, chairman of Lionel. He also discusses the need for better technology for disabled users, and gives his particular views on the Analog Vs. Digital debate.

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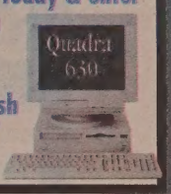

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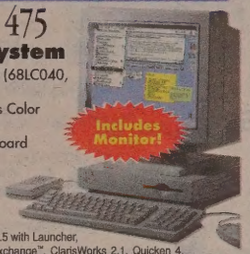

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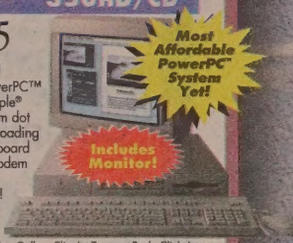

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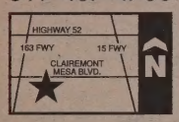

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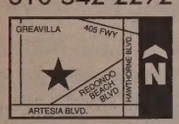

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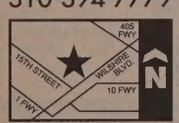

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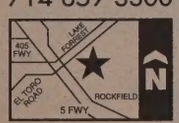

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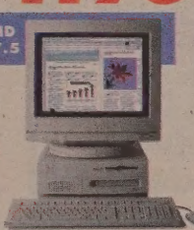

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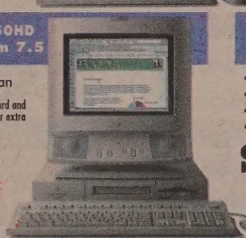

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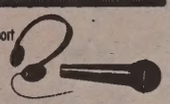

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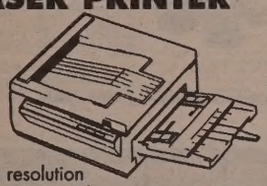

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- 6 ppm print speed
- Variable print density
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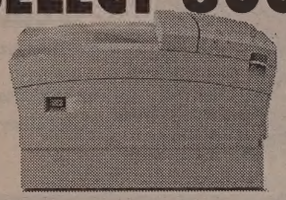

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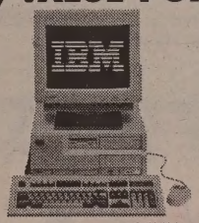

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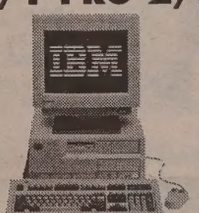
IBM 386SX-20 PS/1 PRO 2/80



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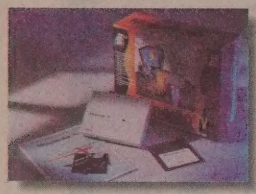

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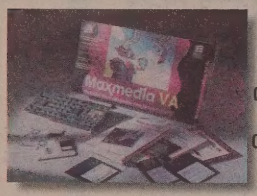

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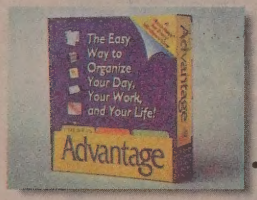

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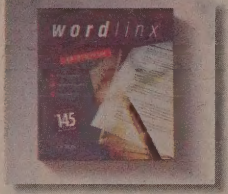

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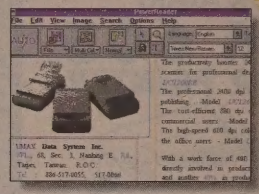

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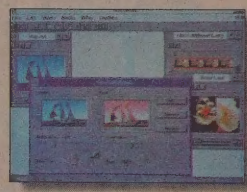

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email: Microx@well.sf.ca.us
EDITOR Mary Eisenhart
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CONTRIBUTING WRITERS Mikael Blaisdell, Anna Couey, John Cowan, Rich Grace, Fred Haslam, Fred Lieberman, Woody Liswood, Judy Malloy, Pamela Mason, Kevin Savetz
EDITORIAL ASSISTANT John Downen
CONTRIBUTING PHOTOGRAPHERS Michael Jay, Anne Knudsen, Susana Millman, Paul Winternitz

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This Vol. 10 No. 14 November 28, 1994, Whole No. 130. MicroTimes, California's Computer Magazine, is published by BAM Media, Inc., 3470 Buskirk Ave., Pleasant Hill, CA 94523. Phone Advertising Office (510)934-3700. Fax (510)934-7351. email Microx@well.sf.ca.us Los Angeles Office, 6767 Forest Lawn Drive, Suite 110, Los Angeles, CA 90068. Phone (213) 851-8600. Fax (213)851-8303. San Jose Office, 36 Harold Ave., Suite 2, San Jose, CA 95117. Phone (406) 244-4400. Fax (408) 248-4552. Anaheim Office, 801 East Katella Ave., Suite #210, Anaheim, CA 92805. Phone (714) 939-2809. Fax (714)978-6135. MicroTimes™ is © 1994 by BAM Media, Inc. Subscription rates: 14 issues, U.S.: 4th Class $35 (Allow 3 to 4 weeks for delivery), 1st Class $65 (Allow 1 to 2 weeks for delivery). MEXICO & CANADA: Surface Mail $50 (Allow 4 weeks for delivery). Air Mail $75 (Allow 1 week for delivery). OVERSEAS: Surface Mail $50 (Allow 6-10 weeks for delivery), Air Mail $178 (Allow 1 week for delivery). To receive sample issues, please send $5 ($6 for overseas) to cover postage costs. Back issues are $6 each. All rights reserved. Reproduction in whole or in part without permission of Publisher is strictly prohibited. The staff and management of MicroTimes do not advocate or encourage the use of any product or service advertised herein for illegal purposes.

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Before

we get to acknowledging our regular, fine contributors, we'd like to thank a number of people who have made this issue's cover story possible:

•**Neil Young**, for talking to us and having interesting stuff to say.

•**Elliot Roberts** and his sterling crew at Lookout Management, for much logistical assistance.

•**Bruce Koball** (whom alert readers will recognize as the chairman of 1993's Computers, Freedom & Privacy conference), who wrote the "Liontech Skunkworks" sidebar and has worked extensively on Liontech projects. Bruce is an engineering consultant with Motion West in Berkeley.

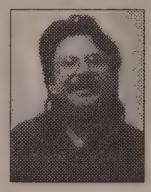
•**David (Rudy) Trubitt**, who wrote the "Recording Rail Sounds" sidebar. David is an audio engineer and free-lance writer who's also been extensively involved with the Rail Sounds project. He's also a frequent contributor to *Mix*, *Electronic Musician*, and other pro-audio publications.

•**Sherrie Weitzman**, director of marketing services at Lionel, who was extremely helpful in connecting us with assorted info and resources, including...

•**Russ Larson**, publisher of *Classic Toy Trains*, who graciously allowed us to use his magazine's original photos of Neil Young's train layout. Russ cordially invites interested parties to call the magazine's 800 number, 1-800-533-6644, for a free copy of the brochure, *Introduction to Model Railroading*.

Thanks to all these folks, who have made this rather unusual project a real joy.

—ME



Lenny Bailes (jroe@well.sf.ca.us)teach-es, writes, and consults about computer-related subjects and lives in San Francisco.

Anna Couey (couey@well.sf.ca.us) is a telecommunications writer and artist.

John C. Dvorak is a much-published columnist with an abiding interest in urban folklore.

Bill Gram-Reefer (reefer@netcom.com) writes the Macintosh News column for *Boardwatch*. By day he's the president of Concord-based WORLDVIEW.

Jonathan E. has worked with desktop multimedia since 1988. He also writes about world music and the Archaic Revival for *BAM*. His USPS mailing address is c/o SoundSwell, 54 29th St., Richmond, CA 94804. His email address is jeve@well.sf.ca.us .

Fred Haslam is an independent programmer based in the Bay Area. His most recent project was coauthoring SimCity 2000.

Matthew Leeds (mleeds@well.sf.ca.us) is a networking czar at Brøderbund.

Woody Liswood (woody@well.sf.ca.us) is a consultant and human resource specialist based in Colorado.

Pamela Mason (PMason@aol.com) is a free-lance writer based in Cloverdale.

Kevin M. Savetz (savetz@sequoia.north-coast.com) is the author of *Your Internet Consultant—the FAQs of Life Online*, Sams Publishing, ISBN 0-672-30520-8.

Tony Reveaux, a San Francisco-based consultant, writes the "MediaScan" column in *Film/TapeWorld*, and is the West Coast Correspondent for *Computer Video*. He can be reached via Internet (luna@well.sf.ca.us) or MCIMail 290-3008.

Mark Will is a free-lance writer based in Whittier. You can reach him on CompuServe (70413,53).

Douglas J. Nakakihara (DNakakihara@BIX.com) is a CPA by trade and an Amiga enthusiast by inclination.

Summer Yacco, who must be pushing eleven by this time, is the daughter of Wayne Yacco, who was our LAN columnist until he discovered multimedia. She contributes occasional reviews of educational and entertainment software.

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Send Letters to the Editor to us at these addresses:

US Mail:
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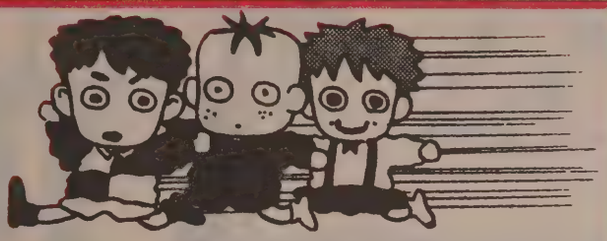

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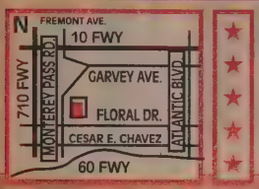

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A Hi-Tech Playground For Kids

By Pamela Mason

SIGkids Teaches Kids About State-Of-The-Art Computer Technologies And The Many Ways They Can Use It

SIGkids, a mini conference within the annual SIGGRAPH conference, showcases the various multimedia, virtual reality, educational, and artistic projects that kids have worked on with their adult mentors during the year and serves as the link between the computer industry and the classroom.

SIGGRAPH, an acronym for Special Interest Group GRAPHics, is part of the Association for Computing Machinery, or ACM, which sponsors this conference for the computer graphics industry each year. SIGGRAPH '94 was held in Orlando, Florida, in July, and next year everyone will be traveling to Los Angeles for SIGGRAPH '95.

The goal of SIGkids is to teach kids about state-of-the-art computer technologies and the many ways that they can be used. They are encouraged to work with multimedia tools and to explore the Internet. Educators, with the help of industry mentors and researchers, create special projects for their students throughout the school year. The projects are submitted to SIGGRAPH and a number of these are chosen to then be displayed by the students and teachers at the conference.

SIGkids consists of several areas. Cyberpark is a type of virtual studio/playground where kids can converse, conceptualize, and share ideas on the Internet and through email or explore the technologies hands-on. For example, a group of students built virtual worlds complete with interactive joystick and 3-D shutter glasses controls. In another area, kids show and explain their projects from booths much like those seen at any trade show. There were various courses and an art show. This year featured the first SIGkids International Animation Festival for elementary and secondary students. The Festival, planned to be an annual event, is the counterpart to SIGGRAPH's Electronic Theater, a night at the movies where the year's best work is presented.

continued on page 208

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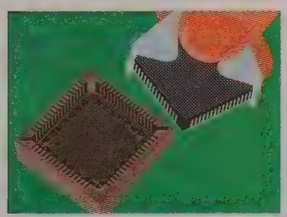
Best of all, it's the most compatible processor upgrade on the market. The ***Make-it 486*** works in almost every motherboard including clones, PS/2's, and even your Zenith Z248's. Besides the increased speed and power of your new 486 processor, now you can run all the 32 bit software you've been wanting to use. Software like Windows enhanced mode, Windows NT, Netware 386, memory managers, and much more. And, if you require math coprocessor support, the ***Make-it 486*** with 487 math coprocessor will dramatically increase the performance of all your critical applications.

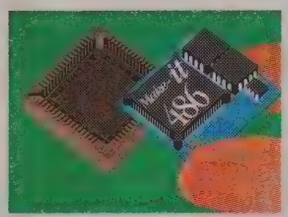
So take your old 286 and ***Make-it 486!***

- *Directly replaces your 286 chip*
- *Uses fast 486SLC processor*
- *Optional Cyrix 487 coprocessor*
- *Simple user installation*
- *Least expensive way to upgrade*
- *Runs Windows & all 32 bit software*
- *Works with 386 memory managers*
- *Guaranteed compatible with your PC*

Out With The Old 286



In With The New 486



Total Upgrade Time: 15:00 min.!

Improve Technologies 345 E. 800 S. Orem, Utah 84058 TEL: 801-224-0088

improve it technologies

FCS
Future Computing Solutions, Inc.
Yorba Linda
714-282-9100

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Los Angeles
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PCW
Gardena
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New Lower Prices

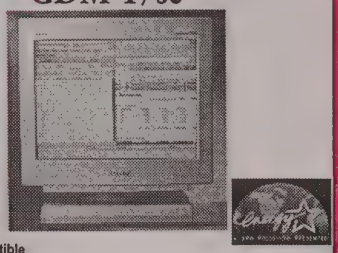
Sony CPD-1730
Trinitron Digital Control Color Monitor

- **Mac Compatible**
- 17" Super Fine PitchTM Multiscan® Trinitron® color display
- .25mm Aperture Grille pitch
- Maximum resolution of 1024 x 768 at 72 Hz refresh (non-interlaced)
- Variable scan frequency of 28 to 58kHz
- Overscanning for crisp edge-to-edge images
- Sony Display Memory System provides easy-to-use digital control of screen images
- Full compliance with Swedish MPR II standards for VLF/ELF magnetic and electrical emissions

$829

New Lower Prices

GDM-17se



- **Mac Compatible**
- 17" Super Fine PitchTM Multiscan® Trinitron® color graphic display
- Unique ASIC design automatically adjusts image geometry parameters across a continuous range of scan frequencies
- Energy Star and VESA-DPMS compliant
- .25 mm Aperture Grille pitch
- Maximum resolution of 1280 x 1024 at 77 Hz refresh
- Horizontal scan range of 31.5 to 82 kHz
- Easy-to-use digital control of screen images
- Includes color temperature control for publishing, photography, imaging, and design applications
- Swedish MPR II compliant

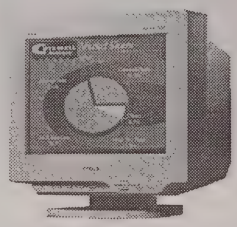
$949

NEW! GDM 20se

- **Mac Compatible**
- 20" Super Fine PitchTM Multiscan® Trinitron® color graphics display monitor
- .30 mm Aperture Grille pitch
- Maximum resolution of 1600 x 1200 at 80 Hz refresh (non-interlaced)
- Variable scan frequency of 28 to 85 kHz
- Overscanning for crisp edge-to-edge images
- Energy Star Compliance Ecologic
- Includes color temperature control for publishing, photo and design applications
- Full compliance with Swedish MPR II standards for VLF/ELF magnetic and electrical emissions

$1829

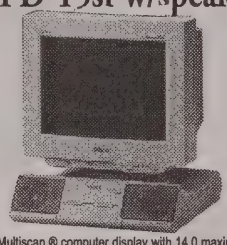
Multiscan® 15sf



- Mac Compatible
- 15" Digital Multiscan® computer display with 14.0 maximum diagonal viewable area
- Trinitron® technology delivers bright images and vibrant colors
- .25mm Aperture Grille pitch
- EPA Energy Star and MPR II compliant
- Supports PC and Macintosh resolutions from VGA to 1280 x 1024 at 60Hz
- New design feature simple control buttons and minimizes footprint
- Includes color temperature control #SON-15SF

$437

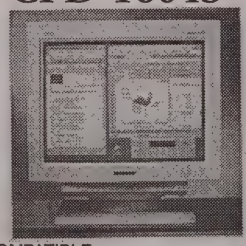
CPD-15sf w/speakers



- 15" Digital Multiscan ® computer display with 14.0 maximum diagonal viewable area
- Trinitron® technology delivers bright images and vibrant colors
- .25mm Aperture Grille pitch
- EPA Energy Star and MPR II compliant
- Supports PC and Macintosh resolutions from VGA to 1280 x 1024 at 60Hz
- New design feature simple control buttons and minimizes footprint
- Includes color temperature control
- INCLUDES SONY CSS-B100 Computer Speaker System Space-saving ergonomical design fits under computer monitor

$569

CPD-1604S



- MAC COMPATIBLE
- CRT: Super Fine Pitch ™ Trinitron 17"
- Aperture Grille Pitch 0.25 mm
- Maximum Dot Resolution 1024x768 NI
- Horizontal Scan Range 28 to 57kHz
- EMI Radiation MPR II

•REFURB• **$569**

CDU-33A01
Internal Double-Speed CD-ROM Drive

•Compatible Formats
-MPCII -Multisession Photo CD -CD-ROM MODE 1 and 2 Discs-CD Digital Audio
•Interface
-Sony SLCD AT-type Bus
•Average Access Time
-320ms typical (double)
-400ms typical (single)

w/o Interface Kit $139

CDU-55S01
Internal SCSI CD-ROM Drive

•Compatible Formats
-MPC II
-Single and Multisession Photo CD
-CD-ROM XA
-CD Bridge
-CD-ROM Mode 1 and 2 discs
-CD-Digital Audio
•Interface
-SCSI-2 bus
•Average Access Time
-Single speed: 350ms
-Double speed: 250ms
-2.4xspeed: 220ms

$229

SDT-5200/M
3.5" DDS-2 DAT Tape Drive

•Cap: 4GB
•Interface: SCSI-2
•Access time: 35 seconds maximum

Int: $849 Ext: $979

SDT-5000/M
3.5" DDS-2 DAT Tape Drive

•Cap: 4GBw/o data compression
8GB w/data compression
•Interface: SCSI-2
•Access time: 35 seconds maximum
•Sustained transfer rate: 366-732 KB/sec.

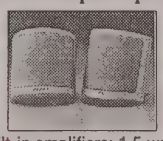
Int: $919 Ext: $1039

SRS-PC20
Personal Computer Speakers

•Built-in amplifiers: 1 watt per channel (2W)
•Speaker controls: Master volume, Bass boost

$33.99

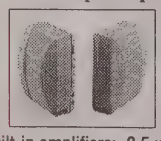
SRS-PC30
Personal Computer Speakers



•Built-in amplifiers: 1.5 watts per channel (3W)
•Speaker Controls: Master volume, Bass boost

$58.99

SRS-PC50
Personal Computer Speakers



•Built-in amplifiers: 2.5 watts per channel (5W)
•Speaker Controls: Master volume, Bass boost

$98.99

SRS-58PC
Active Stereo Speaker System

•Built-in amplifiers: 3 watts per channel (6W)
•Speaker controls:
Independent volume for optimum stereo balance, Independent Dynamic Equalizer System

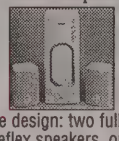
$89.99

SRS-88PC
Active Stereo Speaker System

•Built-in amplifiers: 10 watts per channel (20W)
•Speaker controls:
Independent volume for optimum stereo balance, Independent Dynamic Equalizer System

$139.99

SRS-D2KPC
3-Piece Personal Computer Speakers



•3-piece design: two full-range, bass reflex speakers, one bass reflex subwoofer
•Speaker controls:
Independent volume for optimum stereo balance, Independent Dynamic Equalizer System

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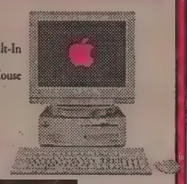
- Complete System
- 68040/25MHz Processor
- 4MB Ram, 160MB HDD
- 12 Software Programs, already Built-In
- 14" RGB Color Monitor
- Fax modem-send fax • KB and Mouse
- Multimedia Ready
- 1 year limited warranty
- 1 year of in-home Service



$1249
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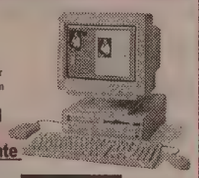
Apple Macintosh Performa® 550

- 5MB Ram, 160MB HDD
- 68030/33MHz Processor
- 4 Interactive CD-ROMs
- 12 Software Programs
- Internal CD-ROM and Music
- Built-in 14" Sony Color Monitor
- Global Village 24/98 Fax/Modem
- Keyboard & Mouse



COMPLETE SYSTEM
$1509
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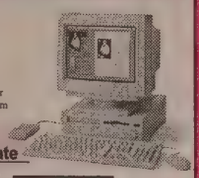
Apple Macintosh Performa® 575

- Complete System
- 68030/33/66MHz Processor
- 5MB Ram, 250 MB HDD
- 4 Interactive CD-ROMs
- 12 Software Programs
- Internal CD-ROM drive for both CD ROM and Music
- Built-in 14" Sony Color Monitor
- Global Village 24/98 Fax/Modem
- Keyboard & Mouse



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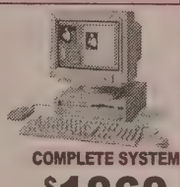
Apple Macintosh Performa® 630CD

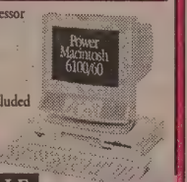
- Complete System
- Motorola 68040 66-MHz processor/33MHz data bus
- 8MB RAM
- 250MB HDD
- Integrated 15" plus Display
- Apple Design KB
- 125fwr programs
- Internal CD-ROM
- Fax/Modem
- 6 CD Titles
- 1 year of in-home Service



COMPLETE SYSTEM
$1869

Apple® Power Macintosh™ 6100/60

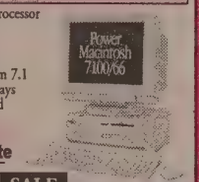
- 60 MHz Power PC 601 Processor
- 1MB VRam
- Built-in Ethernet
- 16-Bit Stereo Sound Input & Output
- System 7.1
- Monitor & Keyboard not included



8/250
$1699
-70 Rebate
$1629 SALE SYSTEM 7.5

Apple Power Macintosh™ 7100/66

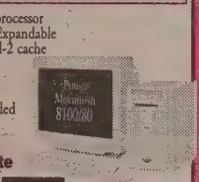
- 66-MHz Power PC 60 processor
- 1MB VRam
- Nine built-in ports
- Expandable to 136MB
- Built-in Ethernet • System 7.1
- Supports All Apple Displays
- KB Monitor not included



8/500/CD
$2869
-80 Rebate
$2789 SALE SYSTEM 7.5

Apple Power Macintosh™ 8100/80

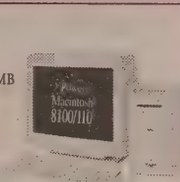
- 80-MHz Power PC 601 processor
- 2MB VRam • Memory Expandable to 264MB • 256K level-2 cache
- Three NuBus slots
- Ethernet (AAUI)
- System 7.1
- Monitor & KB not included



8/500
$3799
-100 Rebate
$3699 SALE SYSTEM 7.5

Apple Power Macintosh™ 8100/110

- 110MHz Power PC 601
- 2MB VRAM
- 256K Level 2 Cache
- Memory expand to 264 MB



16/2GB/CD
$5629

Apple Power Macintosh™ 6100/60AV

- 66MHz Power/PC 601
- 2MB of VRAM
- Support for NTSC & PAL input & output
- System 7.1
- Monitor & K.B not included.

8/250/CD
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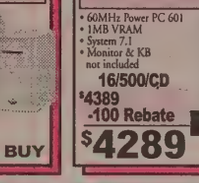
-100 Rebate
$2049 SALE

Apple Power Macintosh™ 7100/66AV

- 80MHz PowerPC 601
- 2MB VRAM
- Two S-Video Adapter
- System 7.1
- Monitor & K.B not included



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-100 Rebate
$2969 SALE SPECIAL BUY

Apple Power Macintosh™ 8100/80AV

- 60MHz Power PC 601
- 1MB VRAM
- System 7.1
- Monitor & KB not included

16/500/CD
$4389
-100 Rebate
$4289 SALE

Apple® Macintosh Quadra® 650

- 33MHz 68040 Processor w/ built Math Co-processor
- Keyboard & Monitor not included

8/230
$2049* *w/purchase of Unitek KB, $149

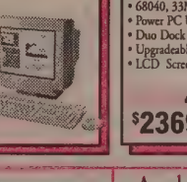
Apple Macintosh Quadra 630

- Motorola 68040 66-MHz processor/33MHz data base
- 8MB RAM • Power PC upgradeable
- Includes Communication slots for Ethernet or Fax/Modem
- Video slot for NTSC, PAL, SECAM video input Card
- Monitor & KB not included

4/250
$1229
-50 Rebate
$1179 SALE SYSTEM 7.5

Apple® Macintosh® Performa® 6115CD

- Power PC 601/60MHz
- 8MB Ram, 350MB HDD
- 12 Software, 7 CD's
- KB, Monitor, Modem



COMPLETE SYSTEM
$2559

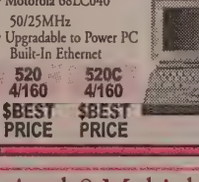
Apple® PowerBook Duo® 280/280C

- 68040, 33MHz, 68LC040
- Power PC Upgradeable
- Duo Dock & Floppy Options
- Upgradeable to 40MB
- LCD Screen

4/240
$2369/$3289

Apple® Macintosh PowerBook® 150

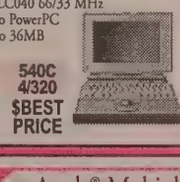
- 68030 Microprocessor
- 33MHz
- 9.5" Backlit, Passive Matrix, Gray-Scale



4/120
$1379

Apple® Macintosh PowerBook® 520/520C

- Motorola 68LC040 50/25MHz
- Upgradable to Power PC Built-In Ethernet



520 4/160 $BEST PRICE
520C 4/160 $BEST PRICE

Apple Macintosh PowerBook® 540/540C

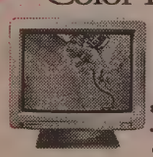
- Motorola 68LC040 66/33 MHz
- Upgradable to PowerPC
- Expandable to 36MB

540 4/240 $BEST PRICE
540C 4/320 $BEST PRICE

BARGAIN

E-MACHINES

Color Page

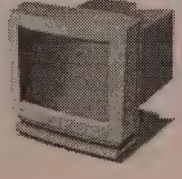


- 17" Monitor
- .26 Dot Pitch
- 1024x768

$639
-100 Rebate
$539

Apple® Macintosh® Color Plus 14" Display

- .28 Dot Pitch
- 640x480 resolution



$299

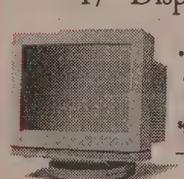
NEW

Apple® Multiple Scan 15" Display

- .28mm Dot Pitch
- 1024x768 Res.
- Headphone/Speakers input & output

$499
-30 Rebate
$469

Apple® Multiple Scan 17" Display



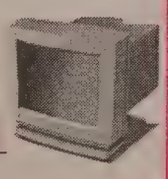
- Trinitron Screen
- Digital Control
- 17" Screen

$989
-50 Rebate
$939

NEW

Apple® Multiple Scan 20" Display

- Trinitron Screen
- Digital Control
- 20" Screen



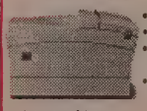
$1999
-80 Rebate
$1919

Apple® Color Stylewriter® Pro

- 360DPI Resolution
- 64 Scalable Truetype Fonts
- Color Sync color Matching Tech

$599
-40 Rebate
$559 SALE

Apple® Laserwriter Select® 310

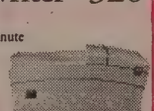


- 300DPI
- 5PPM
- 1.5MB Memory
- Postscript

Limited Time & Quantity SALE
$669
-90 Rebate
$579

Apple® Personal Laserwriter® 320

- 300DPI
- 4 Pages Per minute
- 2MB of Ram
- w/Toner



$879
-30 Rebate
$849 SALE

NEW

Apple® LaserWriter Select® 360

- 600 Dot per inch
- 10 Pages Per minute
- 7MB Ram
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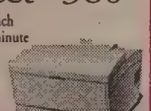

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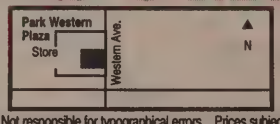

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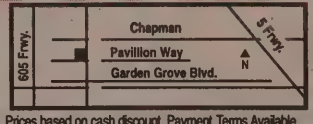

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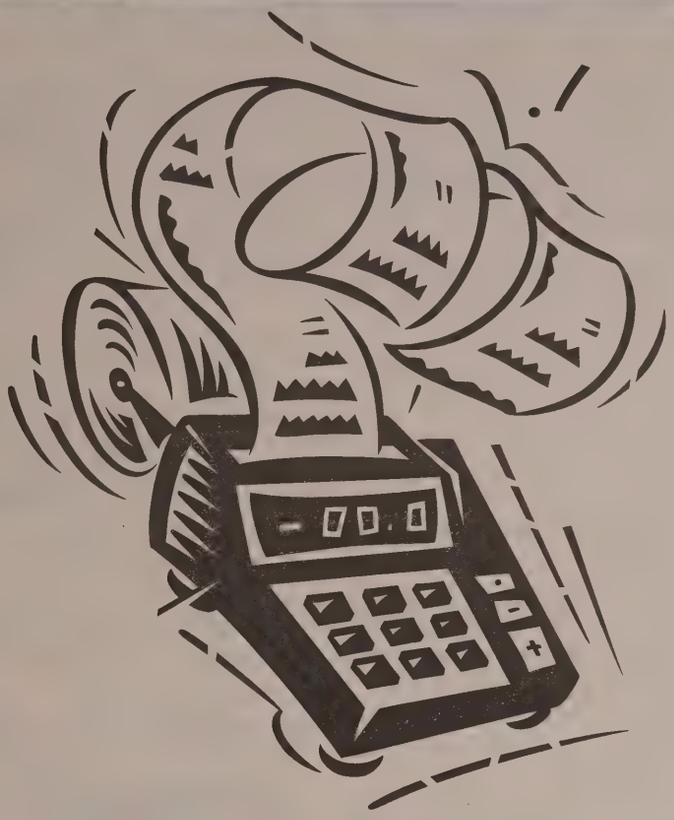

It Makes Little Difference For Tax Purposes If You Buy Software Just In Time To Have The Elves Wrap It Or If You Wait Around For A January White-Out Sale.

By David A. Simon, CPA
and Jennifer R. Cherniss

New rules define the size

of your tax deduction for software used for business purposes and purchased in 1994.

Under the old rules, for software purchased before August 10, 1993, you could generally deduct the cost over a five-year period. That may seem like an excessively long period for something as ephemeral as software, and Congress finally figured that out.

If that isn't how you treated software on your 1993 tax return, however, don't panic. The effect was tempered by a ruling that allowed you to write off the cost more rapidly if you could establish that the particular software clearly had a shorter useful life. This loophole led to a lot of haggling and bickering with IRS auditors, often over small dollar amounts, by folks who would just as soon litigate the amortization life of an icon. Congress finally had enough of it, and put those pesky tax controversies to bed with enactment of yet another Code section.

The new law sets out a general thirty-six-month period for the amortization of computer software, regardless of whether or not you can establish a shorter useful life. For those who like it straight from the horse's mouth, Section 167(f) of the Internal Revenue Code states, in part:

(1) Computer Software

(A) In general. If a depreciation deduction is allowable under subsection (a) with respect to any computer software, such deduction shall be computed by using the straight line method and a useful life of 36 months.

(B) Computer software. For purposes of this section, the term "computer software" has the meaning given to such term by section 197(e)(3)(B); except that such term shall not include any such software which is an amortizable section 197 intangible.

In plainspeak, depreciation for off-the-shelf software is determined by deducting one-thirty-sixth of the cost per month, starting when you buy it (or, more precisely, when it is "placed in service").

Tax Deductions *continued...*

So if you buy the package this December, you can only deduct one month's worth of amortization, or one-thirty-sixth of its cost, on your 1994 tax return. Some people mistakenly rush out to buy software just before their favorite computer store closes on December 31st, hoping to get a last-minute tax break. Don't expect much tax mileage for that trip.

It makes little difference for tax purposes if you buy software just in time to have the elves wrap it or if you wait around for a January white-out sale. If you're fishing for a last-minute write-off, consider purchasing hardware instead, because it is treated differently.

What Is Computer Software?

Not everything that measures 3.5", comes shrink-wrapped, and flops is considered to be "computer software" by the tax police. Computer software is defined for depreciation purposes as "any program (i.e., any sequence of machine-readable code) that is designed to cause a computer to perform a desired function."

But a database or similar item (other than a database that is in the public domain and is incidental to the software) doesn't count as software for purposes of depreciation deductions.

For example, I recently purchased an electronic dictionary and thesaurus. It integrates seamlessly with my word processing application, providing spell-checking and other look-up features. It looks and feels just like the standard spell-checker that comes with that word processor but is substantially enhanced.

According to an example in the House Committee Report, a dictionary feature employed to spell-check a word processing program does not fall within the definition of "computer software" for depreciation purposes. Instead, it gets treated differently, and the old rules continue to apply.

Deducting Updates

Another frequent question is when the cost of updates for business software can be deducted. Surprisingly, existing authority fails to squarely address this obvious question.

If the original software falls within the statutory definition of computer software, presumably the updates would too. But does an update merely supplement older versions, in which case earlier versions continue to be used and depreciated? Or does one update replace the update that came before it, in which case that old version should be retired and any unamortized balance gets written off?

In the absence of more specific legal guidance, I would contend that a more recent update replaces an earlier one; and therefore the taxpayer should deduct any unrecovered portion when buying the replacement.

Arguably, an update also replaces at least a portion of the original release. If the original program costs, say, $500 and the first update costs $100, you'd think that one-fifth of the unamortized balance of the original program should be written off at the time of updating.

There's Always More Megillah

As with any tax accounting rule, there are exceptions to the thirty-six-month amortization period.

First, if software was currently deductible under the pre-August 10, 1993, tax law, it continues to qualify for that treatment. This will be the case for many computer software developers who incur in-house software development costs.

Another exception involves special rules applying to software acquired after August 10, 1993, in a transaction (or series of transactions) involving the acquisition of assets constituting a trade or business, or a substantial portion of a trade or business. In that case, the software is amortized over a painstaking period of fifteen years.

> If you're fishing for a last-minute **write-off**, consider purchasing hardware instead, because it is treated differently.

The specialized rules dealing with business acquisitions are well beyond the scope of this article. In any event, they do not apply to software that is readily available for purchase by the general public, is subject to a nonexclusive license, and has not been substantially modified. So, if you're only dealing with off-the-shelf packages, the long amortization rule can't touch you.

Another exception is a favorable rule that can benefit just about anyone. It applies to bundled software, meaning that the software is included as part of the cost of hardware without being separately stated on the invoice. This rule dates back to the good old days, when you could buy an IBM 360 for a few million dollars or so, and Big Blue would toss in the operating system for free. Back then not every business Joe and his bean counter knew what an operating system was, and it certainly wasn't perceived as a thing of value.

Under the bundled software rule, the cost of the software can be treated as hardware cost. This allows many taxpayers to rapidly depreciate the cost, or elect to deduct it entirely in the year of purchase instead of amortizing it over thirty-six months.

The IRS will buy into this treatment if (1) you consistently follow the practice of treating the cost of software as part of the cost of hardware that is capitalized and depreciated; and (2) the software costs are included on the invoice as part of the cost of the hardware (computer), with no separate charge.

Although this rule may seem hopelessly antiquated, when the rules changed in 1993 the House Committee Report affirmed the bundled software rule as alive and well, providing manna from heaven for some taxpayers.

To illustrate, Hillary is eligible to deduct the cost of her computer as a miscellaneous employee business expense. There would be little or no tax benefit if she amortizes the cost of software over thirty-six months because, as itemized deductions, employee business expenses are deductible only to the extent they exceed 2% of adjusted gross income. Instead, Hillary arranges to have her dealer bundle the software with the hardware purchase, and elects to deduct the whole kit and caboodle in the year of purchase. By bunching all the write-offs into a single year, the dollar amount is large enough to clear the 2% hurdle.

Hardware Is Different

Although the terms "amortization" and "depreciation" are frequently used interchangeably, in tax land they are technically different. Amortization ordinarily refers to the ratable deduction allowed for loss in value of intangible property due to the passage of time; as distinguished from depreciation which reflects wear, tear, and other diminution in the value of tangible assets.

If property is entitled only to amortization, as in the case of software, the cost recovery period is limited to a proportionate (i.e., straight line) deduction over its amortizable life. Computer hardware used in a business, on the other hand, is depreciable. Often, therefore, the costs can be recovered more rapidly.

The rules for depreciating hardware are quite different from those governing software, and are considerably more complex due to the so-called "listed property" rules that apply to computers, automobiles, and certain entertainment equipment. ■

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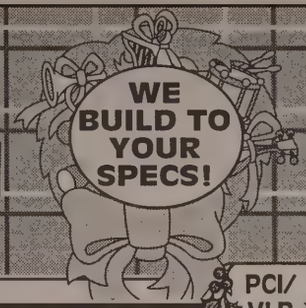

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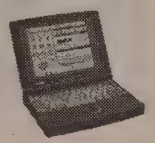

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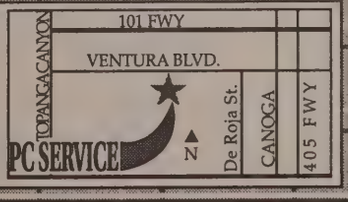

1994 Stocking Stuffs For Amiga Buffs

By Douglas J. Nakakihara

An Amiga user is certainly a more difficult person to shop for than someone who owns a PC or Macintosh. With luck, the following list will give you some inspiring thoughts on what you can buy your favorite computer owner—or even yourself.

Most gift-givers are looking for affordable things, so let's start with that.

Subscriptions

Magazine subscriptions represent the best dollar value for gifts, in my opinion.

Two main Amiga-specific US publications are available, *AmigaWorld* and *Amazing Computing*. Despite their common subject matter, they take considerably different approaches; I have a subscription to both and don't find much duplication, aside from perhaps the advertising.

Generally, *AmigaWorld* has a more refined look, and the articles mirror this. *Amazing Computing*, on the other hand, has more of a grass-roots feel. There is much less structure to this publication, and the articles seem generally to include much more depth and detail. If there's a downside to this approach, it's that sometimes you may not care a whole lot about what they are detailing.

Amazing Computing also puts out an informative semi-annual guide to Amiga products, which is optional with the subscription. Since most users don't subscribe to both publications, you probably won't be duplicating subscriptions.

VideoToaster User is a fine publication for anyone who owns a VideoToaster. It provides a lot of hands-on information and product reviews. The publication has an extremely "tight" relationship with NewTek—although there are reportedly no ownership ties—so you often get some really cool insider-like information.

Assuming the Amiga survives, video is and will be its biggest market, at least in the US. This year, *VTU* went from a bimonthly publication to monthly and I haven't noticed the size getting smaller. Jim Plant, the original editor-in-chief, is back, and the magazine is returning to its original useful style, after deviating from this course for a while.

LightWavePro is an absolute must-have for anyone who works with the 3-D animation program LightWave 3D. Although it bills itself as a newsletter, it is much more. It includes several pages of color glossy pictures and runs about twenty pages from cover to cover.

Its relatively high subscription rate reflects the fact that there are very few advertisers, but it is worth every penny. Each month there are several detailed tutorials on how to do various things with LightWave. Contributors include some of the animators from Amblin Imaging (*seaQuest DSV*) and Foundation (*Babylon 5*). In fact, the editor, John Gross, is an animator at Amblin.

Even if your intended recipient already has a subscription to one of these magazines, you can always extend their subscription for them. Just call the subscription department up; I know they will be more than happy to work with you.

Books And Tapes

ARexx, an Amiga scripting language, has become one of the key advantages to owning an Amiga. Still, a great many Amiga owners are puzzled by it and are missing a powerful built-in tool.

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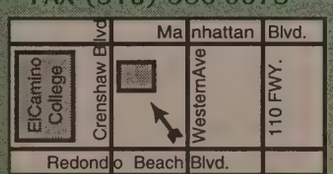

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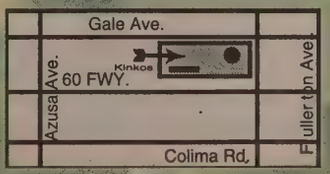

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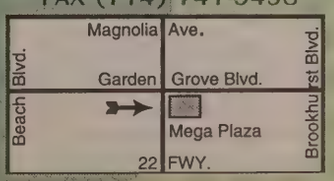

Amiga Stocking Stuffs *continued...*

The ARexx Cookbook by Merrill Callaway is a great starter book and includes many tutorials. There are a lot of instructional videotapes available too, particularly for the VideoToaster and LightWave; the ones with the "smartest Toaster guy" Lee Stranahan are quite good. Lee is as informative as he is entertaining.

How about giving a vacation? AVID Publications has put on some Toaster/LightWave seminars around the country, including some in Hawaii. Some of the sessions feature Stranahan as well as other recognized experts.

Software

You know, it's really hard to buy someone software, unless they've already asked for a specific title.

However, at least one of the mail-order places that advertise in the above-mentioned magazines list their top sellers. This will give you a very good starting point. You can also always call them up and ask for suggestions.

One thing you want to find out first, though, is what type of Amiga system will be used. You should at least know the Amiga model number. Other questions you may face: how much RAM does it have; how big is its hard drive; does it have an accelerator board; what kind of printer is it connected to, etc. All of this is extremely important if you want the person to be able to run the software you give them.

You want specific suggestions? Well, at the top of my list is Pegger 2.0. It is an automatic JPEG compression program that most Amiga owners could really use, particularly those who work with 24-bit graphics and/or video. For graphics painting, you can't go wrong with DeluxePaint. If it will be run on an Amiga 1200 or 4000, make sure you get the AGA version. There should be a wonderful new release of this product out by the time you read this.

For image processing, I'd recommend either Art Department Professional or ImageFX. ADPro is pretty much the standard, but ImageFX is powerful in its own right. Though they share a great many common features, they are very different programs, and owning both is by no means overkill. ADPro was recently significantly upgraded with v1.5, and v2.0 of ImageFX is due out very soon. It is important to note that ImageFX includes several things, most notably a morphing program and painting abilities, that don't come with ADPro.

LightWave 3D has finally been unbundled and would be a well-received gift for anyone who doesn't already own a VideoToaster. Other programs you might consider are Final Writer or Final Copy II for word processing, PageStream for desktop publishing, Bars and Pipes for music scoring, VideoStage Pro or Scala for presentations, and Brilliance for painting. There are tons of games, too!

There are several good Amiga-specific CDs available. Thousands of PD utilities and applications are included on the "Fish"-series and Aminet CDs. The Mod Madness CD contains tons of music modules for hours and hours of listening pleasure. Syndesis puts out some very nice CDs with 3-D objects called 3D-ROM volumes I and II. All of the objects come in multiple formats including LightWave.

Amigas can also generally read CDs made for the PC as well as the Mac. Of course you won't be able to execute PC or Mac programs on an Amiga (without an emulator), but data files that are used by other programs can be very useful. Examples include fonts, audio samples, pictures, and clip art. Since pictures often do not come in Amiga formats, you may need something like ADPro or ImageFX to translate them. For fonts, your only real alternative is TypeSmith, the newest version of which supports PostScript and TrueType fonts. Audio sample CDs often come in WAV format, and there are some good PD conversion utilities available for the price of a download.

Beware—a lot of these CDs are so-called "shovelware." Not a lot of thought went into them, so the CD's contents may not be of the highest quality. Price is often a good indicator, but not always. I'd rather pay a little more for something I can use than get a bargain on something useless.

Look for CDs that come with a referenced printed catalog of their contents. What good is a CD with five thousand PostScript fonts, if you have to go through each one to see what it looks like? Furthermore, since most CDs use the eight-character MS-DOS file naming standard, you are generally looking at a directory of files with names like "MCARTBLD.PFM"—not a whole lot of help, eh?

Hardware

If the Amiga user has more than one Amiga, AmigaLink would make a great gift. This low-end networking product uses the floppy disk ports on the machines. A lot of Amigans use ParNet, but AmigaLink acts much more like a real network and doesn't monopolize the parallel port.

Adding a 24-bit graphics card can breath new life into an Amiga 2000 or 3000, and is even useful on a 4000. Several are out there, but I like either the Picasso or Retina.

CD-ROM drive prices have dropped considerably, and now may be the time to get one. All CD-ROMs require an interface and there are basically three types: SCSI, IDE, and proprietary. Proprietary interfaces are generally bundled with the CD unit and are usually useless on an Amiga (unless they are run in a PC slot with a PC bridgeboard). I would guess that an IDE CD-ROM should work with an Amiga 4000's or Amiga 1200's built-in interface, but I'm not sure. Check with an Amiga dealer first. SCSI is the most common Amiga interface and is generally compatible with any SCSI CD-ROM. These are often units made for the Mac.

There are many features that differentiate CD-ROMs, but probably the most hyped is the rotation speed. You'll often hear the terms single-speed, double-speed, triple-speed, and even quad-speed. The basic difference is how fast the data can be read from the CD. Quads are obviously faster than doubles.

You'll also see terms like XA-ready or compatible, multi-session, etc. These terms relate to the drive's ability to read Kodak PhotoCD and the VideoCD discs. No single-speed drive has these capabilities, but most double-speeds do. It should be pointed out that these two things have not really caught on and single-speed SCSI drives can be had for as little as $100. Recently, I got a nice external double-speed unit for under $200!

You'll also need CD filesystem software, since it is not yet part of AmigaDOS (<3.1). This should be available from any Amiga dealer. However, there are PD filesystems, which I am told work just fine, available on many BBSes.

Keeping in mind the same interface requirement, a hard disk would be a much appreciated gift. I've seen one-half gig hard drives for around $300. They even carry them at the local club store! Of course these are IDE drives, but SCSI drives at the computer stores are not much more.

Tape backup drives are also useful items. Generally, the Amiga is not compatible with the standard PC types. You'll usually need to get a SCSI tape drive. 4mm DAT drives are the most common type and these hover around the $1000 mark, give or take a few hundred dollars. Exabyte 8mm drives are an alternative, but these are twice as expensive! The advantage of Exabyte drives, however, is that they are the professional standard used to transfer graphic images.

Tape drives also require backup software. I've used Ami-back for years without problems. Tapeworm is a great product too—it allows you to use a tape drive like a standard hard disk. Granted, the linear nature of tape negatively impacts performance, but it works pretty well for storing things like animation frames.

If you select some type of external SCSI device, be sure to also get the correct cable. Amigas normally have 25-pin connectors, but often a 50-pin one is needed, especially if there is already one external SCSI device connected. It's pretty disappointing to get a new toy and not be able to use it right away because you don't have the right cable. There is also something called "termination." Suffice it to say that generally you should buy an external device unterminated and get a external termination plug.

Don't be afraid to ask a friend of the gift recipient for suggestions. They may know exactly what the person wants. An Amiga dealer may also offer helpful suggestions and if there isn't one near you, call one of the Amiga mail order houses.

Well, have fun shopping and have a merry Christmas and a happy New Year! ■

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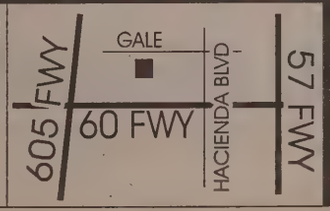

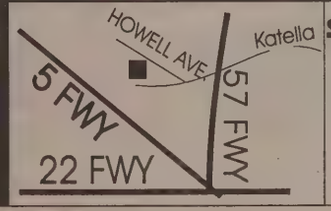

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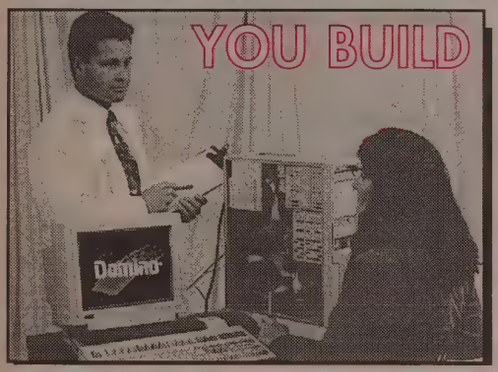

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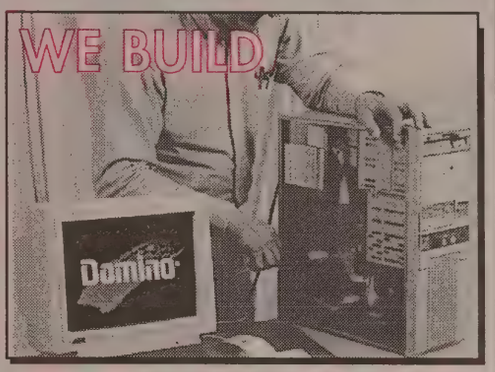

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- Hi-Resolution Mouse w/Pad
- Double-Spin (2X) CD ROM Drive
- 16 Bit Sound Blaster Compatible Card
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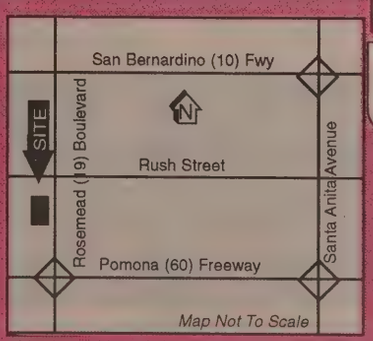

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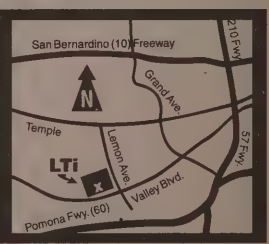

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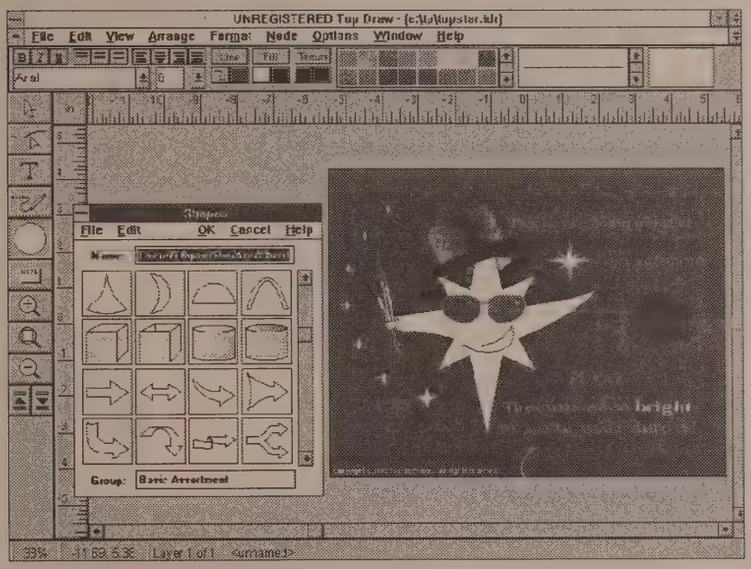
Holiday Shareware Roundup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The Year's Best PC Software Buys

By Lenny Bailes

While heavyweights in the software world duke it out to see whose $500 to $1000 products will dominate the marketplace, the PC shareware world continues to offer great bargains. For under $100, you can find productivity applications, useful utilities, and games that match the features found in well-known commercial packages. You may also find a few unique, specialty items that have no equivalents in the commercial world.

Shareware programs can be had for the cost of the diskettes that contain them, or downloaded from your nearest public bulletin board system. You have a period of weeks or months to evaluate the software at your leisure. If you decide that you like what you see, a registration fee of less than $100 will get you full documentation, technical support, and access to program enhancements.

The Association of Shareware Professionals is an organization that exists to monitor program quality, protecting both authors and consumers. If you find a READ.ME file included with a package that proclaims the author a member of ASP, you have several guarantees: 1) you won't be getting a "crippled" package that deliberately disables program features, 2) the package has been tested to meet certain standards of quality, and 3) the authors won't suddenly skip town when you need technical support. The following packages are among the Shareware "Cream of the Crop" for 1994, suitable for holiday season presents, or as introductions to the vast worlds of DOS and Windows software:

TopDraw: A Professional-Level Drawing Package

This Windows program would make a great gift for artsy, graphic-designer types who don't have the financial resources to own Freehand, or CorelDRAW. It implements enough features to let you construct professional-looking posters, logos, and clip art.

TopDraw is a vector-drawing package that allows you to edit and manipulate bezier curves and geometric shapes, rotating, skewing, adding, and deleting nodes. You can automatically duplicate objects, transfer object styles, and add objects on multiple drawing layers. The tools palette includes multiple zoom views, freehand drawing, node-edit, text, and custom shapes. You can paste in bitmaps and vector objects through the clipboard, or import them as .BMP, .PCX, or Windows Metafiles. Text can be fitted to a curve or line, and converted to bezier curves; screen-objects can be rotated in 1-degree increments. Images can be edited in full-screen preview, or represented as wire frames.

The custom drawing pens and fills allow you to create two-color gradient fills in a variety of blend patterns, with control over the gradient steps. It supports two color schemes: RGB (red-green-blue), and HSB (hue-saturation-luminosity). The shapes palette includes one hundred predefined figures, including musical notation, common geometric shapes, and a variety of wire-frame and full-color symbols.

Although the unregistered version does not include a manual, the program is easy enough to use for anyone who's ever tinkered with a professional drawing package. Registration brings a manual and a series of extra patterns for the texture palette.

TopDraw requires Windows 3.1, a VGA display, 4MB of RAM, and 2MB of free hard disk space.

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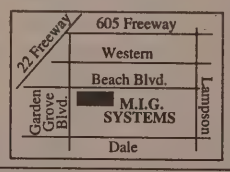

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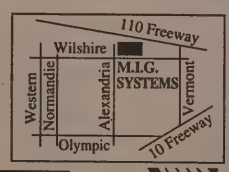

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Holiday Shareware Roundup *continued...*

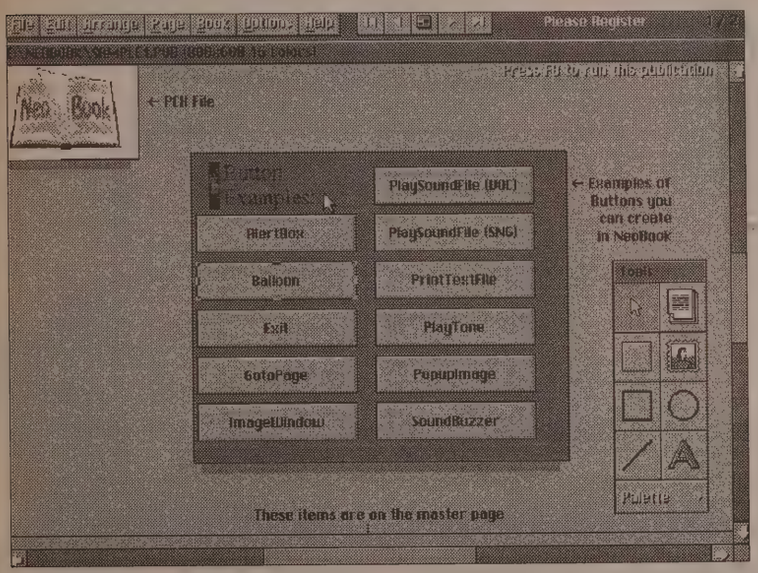
The NeoSoft Suite

Last year we reviewed NeoSoft's NeoPaint, a full-featured paint program and graphic image editor. In 1994, NeoSoft issued a suite of additional shareware utilities and applications.

QuikMenu is a graphic, point-and-shoot desktop interface/file manager, reminiscent of GeoWorks. It sits on top of DOS, allowing you to create program or datafile icons on the desktop, display a tree-based file manager, view files, or pop up a series of desktop utilities (including a calendar, calculator, and phone book). QuikMenu makes a great menu/front-end for novices unfamiliar with the intricacies of DOS or Windows.

NeoShow is a desktop presentation utility that allows you to create simple slide shows from bitmapped .PCX or .GIF images. It includes a variety of animated transition effects, fades, wipes, dissolves, etc. Prerecorded sound files in the Sound Blaster .VOC format can be attached to slides. NeoShow Professional, an upgrade package, contains a run-time compiler to assemble your shows into .EXE files that can be freely distributed.

NeoBook is a hypertext/multimedia/desktop presentation package. You can use it to create interactive slide shows, combining text, graphics, and sounds. NeoBook allows you to create buttons to page forward and backward in a presentation, pop up additional text balloons or graphic images, play sound files in .SNG or .VOC formats, or print specific text files. NeoBook will let you construct electronic newsletters, interactive books, magazines-on-a-disk, or sales presentations and product literature. NeoBook Professional allows linkage to external sound editors, and audio playback through Sound Blaster-compatible cards or the internal PC speaker.



Jam, A Disk Compression Utility

This Stacker clone was written by a programmer in the Ukraine, and it works! If you're looking for additional hard disk storage space, and don't own either Stacker or a version of DOS with Doublespace/Drivespace, this shareware utility efficiently and reliably expands your hard disk by 200 to 250%.

It includes all of the same features as its commercial counterparts, except for the ability to automatically recognize a compressed boot drive. Jam includes its own utilities for directory display and disk optimization, which transparently replace DOS utilities. Compressed volumes can be mounted, unmounted, or swapped with uncompressed drive letters via Config.sys statements, or with command-line batch files.

If you already own Doublespace/Drivespace or Stacker, this program can

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Holiday Shareware Roundup *continued...*

coexist with these commercial compression schemes, allowing you to temporarily create and mount smaller compressed volumes on an uncompressed drive. (Jam creates more storage space than Microsoft's compression schemes or Stacker 3.1. It can be registered for only $11, if you already own one of these products, or $49, if you want to use it with DOS 5.0 and below.)

College Bound Advisor

This menu-driven database is designed to help high school students select a college, apply for scholarships, and budget projected college expenses.

It presents a series of hypertext essays on seeking financial aid, scholarships, and loans, as well as a listing of information sources, state agencies, and glossary of terms. A letter-writing feature lets you use the databases to create letters requesting information from various universities. Spreadsheets allow a potential student to calculate cost comparisons by entering data for estimated family contributions and projected yearly expenses for tuition, room and board, etc.

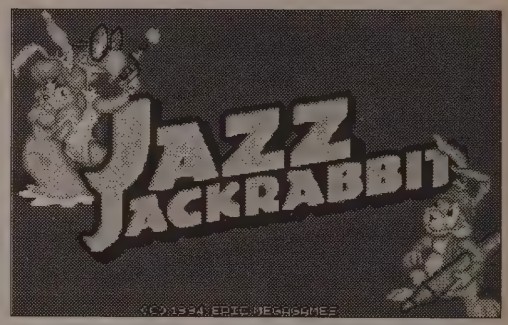
The essays include information about various types of scholarships, loans, and work-study programs, and hints on how to qualify for financial aid. Tutorial material debunks the idea that students from middle-class families can't qualify for assistance, providing a list of self-help strategies. A comprehensive pop-up list of state agencies makes it easy to generate letters of inquiry about available programs. A direct dialing feature allows a modem to dial telephone numbers included in the attached database through a Hayes-compatible modem.

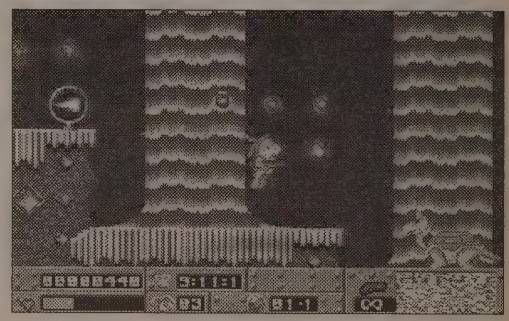
Games

And now that we've covered a few of the useful and educational packages out there, here are some colorful, action-adventure games for the junior-high school set.

•Jazz Jackrabbit: It's up to Jazz Jackrabbit to run up and down the length of the planet Diamondus, search for the captured Princess Eva Earlong, and save the Galaxy from Turtle Domination.

The monotonous scheme of "encounter villain and blast through to the next level" is offset in this Epic MegaGame by the imaginative quality of the landscapes and the cartoon animation. You run the rabbit through an endless array of extra-terrestrial landscapes, jumping from mountain to mountain,





and wading through underground caverns as you destroy the minions of turtle terrorist Devon Shell, picking up ammo and carrots on your tour of the exotic landscape.

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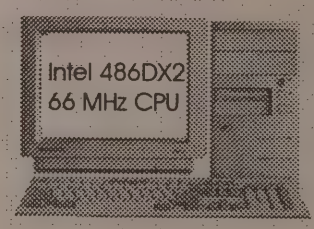

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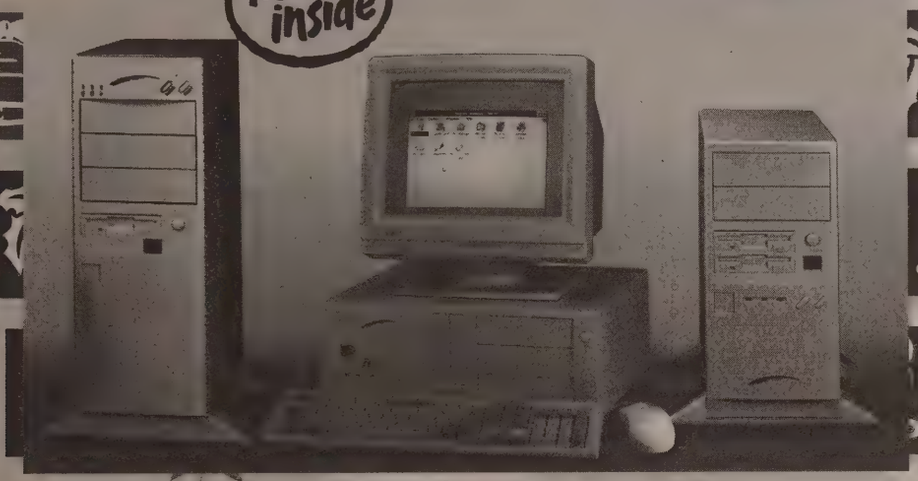

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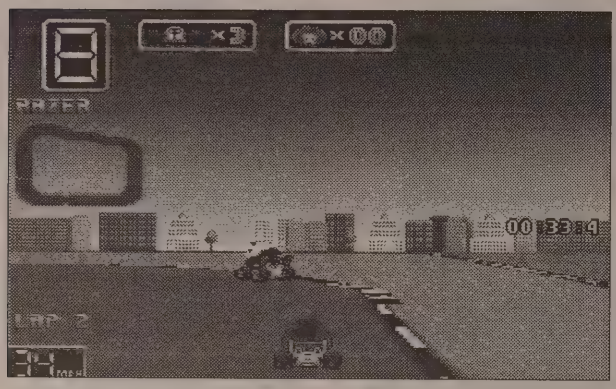

The shareware version includes four levels of difficulty and one episode. Registering the package allows you to buy up to five additional episodes, thirty-six game levels, and 5MB of cartoon animation. Jazz Jackrabbit requires an 80386 33MHz machine with 4MB of RAM and a VGA display.

•Wacky Wheels: Wacky Wheels is a funny-car racing adventure. Your funny-animal driver is pitted against seven rivals, some of whom can be other real-time players. You zoom around the track, competing with opponents who are programmed to analyze your playing style, bump you off the road, and occasionally toss obstacles in your path.

As is typical in Apogee games, there are a number of extra features for players who get bored with the main event. The race track includes options to shoot at ducks, mow down hedgehogs, and engage in combat with other drivers. But believe it or not, Wacky Wheels is less violent than the bulk of the Apogee catalog, which includes famous "zoom and shooters" like Wolfenstein 3-D and Raptor. A computer journalist acquaintance of mine takes real-life pleasure in gunning his engine through parking lots and mowing down hapless pigeons caught in his path. This fits in fairly well with some of the advanced options of Wacky Wheels.

The basic shareware package includes one track scenario, and a number of practice routes. Online support allows two players to compete via modem. The full registered version includes twenty-one different track scenarios, sixteen songs, and a number of sound effects that can be played through a sound card or the PC speakers. Wacky Wheels requires 2MB of extended memory and a VGA monitor.

•Windows Detective: Windows Detective is an adaptation of the old Parker Brothers "Clue" with a new science fiction setting.

The object of the game is to be the first to solve a murder on a space station, identifying the culprit, the weapon used, and room where the crime was committed. You play against three famous "computer sleuths," moving between the "docking bay," "armory," "command deck," etc.

Inside each room, you interrogate suspects and pick up clues based on the cards dealt to you and the other players. You can pop up a virtual notepad to keep track of the eliminated possibilities. Alternate card sets with additional suspects and weapons can be downloaded free from various bulletin board systems.

There are three levels of play that increase the sharpness of your opponents' playing styles. In the registered version, you can turn on an additional feature that adds a list of six motives to the crime scenario. You then have four factors to nail down for your accusations instead of three. ■

continued on page 111

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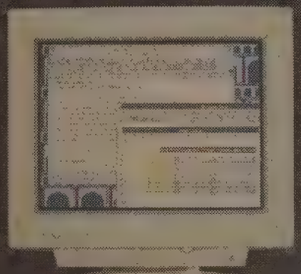

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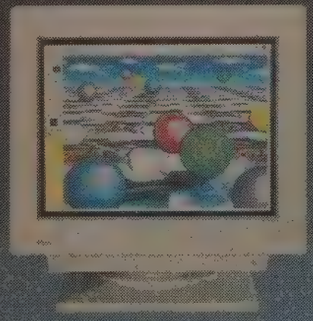

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Watching Windows At Work

By Woody Liswood

Can Choosing A Display Card Affect Windows?

Windows makes you more aware of screen redraw speeds. These days, even with a fast CPU, a standard VGA card is rarely sufficient. At higher resolutions you will be watching your screen redraw, rather than having everything snap into place.

There are a great variety of Windows accelerator boards available, each claiming to make Windows run faster than its competition. Currently, most of these boards run in the ISA or VESA Local (VL) bus environments. While a new industry standard—the PCI bus—is not far down the road, PCI cards and motherboards are not yet readily available.

The typical technical review of a new accelerator board is interesting, but you often need an EE degree to interpret it. Even after it is translated, that type of review seldom tells me much about the everyday experience of working with a particular board. I am less interested in the numeric rating of how fast the board tests than how fast my screen redraw will "feel" with the various applications I use. In other words, I want to know which board feels faster than another and which ones are too similar to make a noticeable difference.

To answer this question I looked at eleven boards, including ISA and VL bus versions. I also examined the new Power Graphite boards from Hercules. In addition to my own perceptions, I selected Texas Instruments' WinTech test program to compare my experience with more quantifiable results. Many manufacturers believe WinTech provides a fair test whose results can be used for comparisons. WinTech v1.2 gives performance test results for Word Processing, CAD/Drawing, Spreadsheets, and Paint programs as well as an overall rating.

Running The Tests

The testing was done using a 486, 66MHz Biostar motherboard with 20MB of RAM, managed by Netroom. The display resolution was set at 1024 x 768 with 256 colors. I was running the Program Manager as my Windows shell, with After Dark screen saver, PrintQ, and all the drivers to run my normal setup, such as SCSI drivers, a CD-ROM cache driver, and a scanner driver, in the background.

While in the final stages of testing, I upgraded my system with an American Megatrends 60MHz Pentium. I reran the fastest ISA and VL boards with the Pentium and added the results to the accompanying chart.

Test Results

The numbers on the chart give the most meaning when used for comparisons. I could

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continued

not say, for instance, that the overall rating of 48.33 for the Hercules VL bus board is linearly or geometrically faster than the 46.61 rating for the Hercules ISA board. What I can say, is that the test supports my experience—the Hercules VL bus board seemed faster than the ISA board.

A quick summary of the results is that graphic accelerator boards really do speed up the process, and that, all other things being equal, the VL bus boards are faster than the ISA bus boards. Within the Hercules family, the new Power Graphite series is significantly faster than the older Graphite series. Also, to my surprise, switching from a 66MHz 486 to a 60MHz Pentium system made another big difference, for both ISA and VL bus boards.

Cost does not always guarantee better results. The less expensive, generic VL card was faster than the more expensive #9GXE ISA board.

Although it is generally safe to expect screen redraw speeds to be slower at higher resolutions, this is not always the case. Brilliant Computer Products Cloud9 in particular runs faster at higher settings. According to BCP, their boards are optimized for particular higher resolutions. The Cloud9 comes with 2MB of video memory on board, rather than the standard 1MB on the others.

BCP also uses an NCR graphic chip. While the board my not be as fast compared to the Hercules Power Graphite series, it is considerably less expensive and outperformed the clone boards I tested.

continued

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Accelerator Cards *continued*

Conclusion

In general, acclerator boards at the same level work about the same. The one main exception was the Video 7 Win Pro board, which had compatibility problems with my communications software. However, this may be less important now that Video 7 is no longer in business.

In today's marketplace, if you are getting a new system or upgrading your motherboard, you should give serious consideration to a VL bus accelerator board like the Hercules Power Graphite. Maybe tomorrow I will do this all again with PCI motherboards, but for now I am happy with the VL bus and its screen redraw performance. ■

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Board (System)	WP	CAD/Draw	Spreadsheet	Paint	Overall
Hercules Power Graphite VL (Pentium)	21.55	122.47	65.89	78.59	72.82
Hercules Power Graphite ISA (Pentium)	20.63	78.79	56.57	69.22	56.28
Hercules Graphite VL (486)	16.23	75.98	44.13	56.98	48.33
Hercules Power Graphite ISA (486)	17.4	72.24	46.69	50.12	46.61
Hercules Graphite ISA (486)	9.67	46.84	28.26	31.59	29.09
BCP Cloud9 VL (486)	20.17	18.73	39.37	26.67	26.24
Video 7 Win Pro (486)	11.46	35.53	34.4	22.52	25.48
Generic VL (486)	13.26	28.97	29.33	30.25	25.45
#9GXE ISA (486)	13.77	28.77	28.26	19.09	22.47
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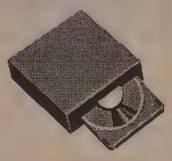

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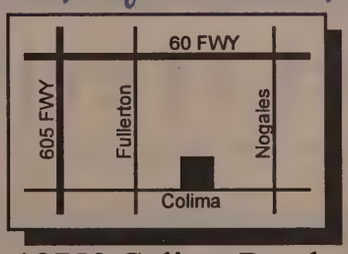

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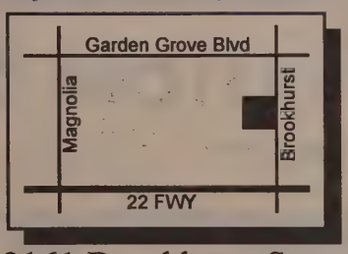

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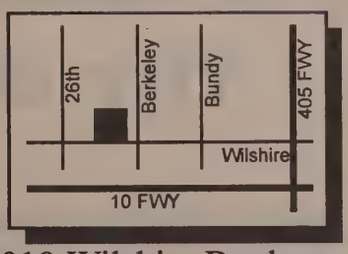

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Colorado 2.0GB Power Tape Internal	999

NETWORKING

Ethernet 16-bit Jumperless Combo (BNC/RJ)	29
Ethernet 10BaseT Hub 8 Ports	199
Ethernet 10BaseT Hub 16 Ports	349

SOFTWARE

Microsoft DOS6.22/Windows 3.11 (w/system)	79
Microsoft Windows for Workgroups 3.11	69

PRINTERS

Hewlett Packard Deskjet 540	289
Hewlett Packard Deskjet 560C	499
Hewlett Packard Deskjet 1200C	1,399
Hewlett Packard LaserJet 4L	649
Hewlett Packard LaserJet 4P	949
Hewlett Packard LaserJet 4 Plus	1,369
Hewlett Packard Color LaserJet (NEW)	5,999

SCANNERS

Hewlett Packard Scanjet IICX	929

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Sound BLASTER
TOSHIBA 3501B QUAD SPEED SCSI CD
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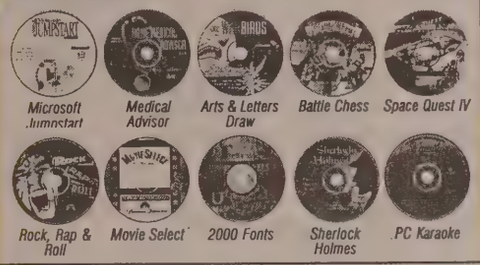
BUNDLE A: 10 ACTUAL CDs



BUNDLE B: 14 TITLES

Compton's Encyclopedia
World Atlas MPC
U.S. Atlas MPC
Mavis Beacon Teaches Typing
Chessmaster 4000
RoboCop 3-D
F-29 Retaliator
Push-Over
EPIC
Life & Death 2
Might & Magic II
D/Generation
Contraption Jack
Chessmaster 2100

YOUR CD TITLES HEADQUARTERS

REFERENCE
COMPTON'S 1994 INTERACTIVE ENCYCLOPEDIA
Add Compton's comprehensive 27 volume interactive encyclopedia to your CD library. Over 33,000 articles at your fingertips for research, exploration, or just plain fun.
SPECIAL: $19.97

TOP 10 GAME
STAR WARS REBEL ASSAULT
This year's #1 CD Game from Lucasarts, the creators of Star Wars & Indiana Jones. Join Luke Skywalker, Han Solo & Princess Leia fight Dark Vader & the Imperial Forces.
SPECIAL: $24.97

TOP 10 GAME
MAXIS SIM CITY 2000
Create your own city with Maxis' Sim City 2000. You can build beautiful bridges & towering skyscrapers. But watch out! If you do it wrong, you'll have to deal with angry citizens!
SPECIAL: $19.97

FOR KIDS
KIDS CAN READ
STORYTIME SERIES: 7 TO CHOOSE FROM!
Your kids can learn to read with Kids Can Read Storytime Series and favorites like Peter Rabbit, Cinderella, Aesop's Fables, Benjamin Bunny, and many more.
$9.97 TO $14.97

FAMILY/PRODUCTIVITY
NATIONAL GEOGRAPHIC EXPLORER SERIES: 7 TO CHOOSE FROM!
Your entire family can explore the world with the NG Explorer Series. Choose from Farm Animals, Whales, Dinosaurs, Birds, What Air Can Do, Butterflies & Spiders.
SPECIAL: $14.97

MICROSOFT BOOKSHELF
1993 Version
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IRON HELIX
SPECIAL: $19.97

INFOCOM RETURN TO ZORK
SPECIAL: $19.97

JUST GRANDMA AND ME
SPECIAL: $14.97

SAN DIEGO ZOO: THE ANIMALS
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3-D Dinosaur Adventure	19	Corel Draw 3.0	69	Kid's Read: Mud Puddle	15	Nat'l Geographic: Whales	9	**NEW ARRIVALS**	
5 Foot 10 Pak Vol.2 (10 CDs)	29	CyberRace	29	Kid's Read: Paper Bag Princes	15	National Parks	19	**NEW TITLES EVERY WEEK!**	
7th Guest (2 CDs)	19	Dark Seed	25	Kid's Read: Peter Rabbit	15	Newsweek Interactive	15	11th Hour	Call
America Alive!	19	Day of Tentacle	19	Kid's Read: Scary Poems	9	Parenting	19	2000 Fonts by Fantazia	15
Animals, San Diego Zoo	10	Dinosaur Adventure	19	King's Quest VI	19	PC Karaoke: Family Fun	15	Auto Almanac	19
Arthur's Teacher Troubles	15	Dinosaur Encyclopedia	19	Kodak Photo CD Access	15	PC Library	19	Critical Path	25
Arts & Letters Draw: Warbirds	15	Dinosaur Safari	19	Legend of Kyrandia	25	Peter & the Wolf	9	Destination: Mars	25
Asia Alive!	19	Dr. T's Sing-Along for Kids	19	MacMillian Children's Dictionar	19	Pro Phone Business -1993	19	Dino/Space Adventure (2-in-1)	29
Audubon's Birds	15	Europe Alive!	19	Mad Dog McCree	19	Protostar	25	Dracula Unleashed	25
Audubon's Mammals	15	European Racers	29	Man Enough	29	Rebel Assault	25	Haldeman Diaries: Nixon Yrs	19
Back Road Racers	19	F-117A Stealth Fighter	19	Mario is Missing	19	Relate with Ease	25	Hobbe's OS/2	19
Battle Chess Enhanced	15	F15 Strike Eagle III	19	Mathematics Library	19	Return to Zork	19	Images of NASA	25
Beauty & the Beast	9	Family Doctor	19	Mavis Beacon Teaches Typing	19	Ring World	19	Mad Dog McCree 2	25
Berlitz French (8 CDs)	99	Gardening	19	Mayo Clinic Health Book	19	Secret of Monkey Island, The	19	Microsoft Encarta '95	59
Berlitz German (9 CDs)	99	Great Cities of the World	19	MegaRace	19	Secret Weapons of the Luftwal	19	Movie Select	19
Berlitz Spanish (8 CDs)	99	Grolier's Encyclopedia 1.5	9	Microcosm	19	Space Adventure	19	Multimedia World History	19
Best of Media Clips	9	Grolier's Encyclopedia 6.0	19	Microsoft Bookshelf '94	59	Space Quest IV	15	Outpost	19
Bibles & Religion	9	Gunship 2000	19	Microsoft Cinemania '94	39	Space Shuttle	19	Quantum Gate	25
Blue Force	25	Home Medical Advisor	15	Microsoft Dinosaurs	39	Star Trek-25th Aniversary	25	Rock, Rap & Roll	19
Business 500	19	Hugo's House of Horrors	9	Microsoft Encarta '94	39	Star Wars Chess	19	SimCity 2000	19
Business Library (12 Titles)	29	Indiana Jones/Fate of Atlantis	19	Microsoft Works Multimedia	39	Stellar 7	19	Star Crusader	95
Capitol Hill	15	Iron Helix	25	Monarch Notes	19	Street Atlas USA	19	Syndicate	15
Clinton	15	Jones in the Fast Lane	9	MPC Wizard 2.0	19	Tempra Access	39	U.S. Air Force: Clips	9
Clipart Heaven	19	Journeyman Project	29	Myst	39	TFX Tactical Fighter	25	U.S. Amphibious Assault: Clips	9
Clipart Heaven 2	29	Jurassic Park Screen Saver	15	Nat'l Geographic: Birds	9	The Lawnmower Man	25	U.S. Marines: Clips	9
College Handbook	19	Just Grandma & Me	15	Nat'l Geographic: Butterflies	9	Time Table of History	29	U.S. Military Helicopter: Clips	9
Colossal Cook Book	9	Kid's Read: Aesop's Fables	15	Nat'l Geographic: Dinosaurs	9	Time: Man of the Year	9	U.S. Navy Aircraft: Clips	9
Compton's Int. Encyclopedia	19	Kid's Read: Benjamin Bunny	9	Nat'l Geographic: Farm Anima	9	Tower of Terror	19	U.S. Navy Ships: Clips	9
Conspairacy	24	Kid's Read: Cinderella	15	Nat'l Geographic: Mammals	9	U.S. Atlas MPC	19	U.S. Submarine: Clips	9
Corel Art Show 4	15	Kid's Read: Heather Hits	15	Nat'l Geographic: Spiders	9	Whales & Dolphins	19	Aegis: Guardian of the Fleet	35

ADULT CD TITLES	
MUST BE 18 OR OLDER!	
101 Sex Positions	35
Adult Movie Almanac	39
Adventures of Seymour Butts	29
Amorous Asian Girls	25
Asian Palette	29
Baby's Got Butt	29
Centerfold & Covergirls	29
College Girls	29
Dirty Debauntes (HOT!)	39
Dream Machine (HOT!)	39
Erotic Adult Sampler	9
Hidden Obsessions	29
House of Dreams	29
Immortal Desire	29
Legend 4	29
Menage A Trois	29
New Wave Hookers	29
Night Watch Interactive II	39
Sensual Pleasure	19
Sexy Lingerie	19
Seymour Butts in Paradise	29
Sorority House	45
Sweet Body	19
The Legend of Kama Sutra	29
Traci Lords: I Love You	29
Urotsujidiji (HOT!)	39
Virgins	29
Virtual Vixens (HOT!)	39

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Stuck in the computer slow lane? Then try Envision's Pentium Powerstations on for size! Envision has value priced Pentiums to fit your budget starting from under $1,400. With performance up to 250% faster than a 486DX2-66, they fly. At these prices, they'll leave our showrooms even faster! Come in to an Envision Multimedia Computer Center and try one on for size today.

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Intel Pentium 250% Faster Than 486

Envision Pentium Powerstations are powered by advanced Intel Pentium™ technology with speeds up to 250% Faster Than 486DX2-66s, enough power for the most advanced applications.

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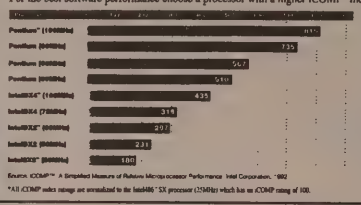
For the best software performance choose a processor with a higher iCOMP™ Index.



3.3 Volt Design

Envision Pentium 90 Systems incorporate new 3.3 Volt technology for lower power consumption and cooler operation so that your computer can run more optimally and efficiently.

Enhanced IDE Hard Disks

Enhanced IDE is standard on all Pentium Powerstations giving you super fast access to your data at lightning-fast 11 MB/s tranfer rates for up to 3 times the performance of typical IDE drives.

64-bit Accelerators

64-bit PCI graphics accelerators are now standard on all Pentium Powerstationsgiving you two to three times faster graphics than average 32-bit graphics accelerators. That way, you can see what you want to see with less waiting.

PCI & VESA Local Buses

Every Envision Pentium Powerstation also comes with not one, but two local buses - PCI & VESA - to give you greater flexibility and ensure compatibility with a wider range of peripheral add-on cards.

Hi-Speed Serial Ports & Enhanced Parallel Ports

Every Envision Pentium Powerstation also comes with two hi-speed 16550 UART serial ports, for faster data transfer with your hi-speed modem or serial device, and an enhanced parallel port for bi-directional buffered communications between your printer and your computer for error-free printing.

Standard System Features

- Intel Pentium-60 or 90 MHz CPUs
- 3 PCI & 2 VESA Local Bus Slots
- Energy Star Green PC Power Saver
- 256K External Write-back Cache (ex to 1MB)
- 3.5" 1.44MB Floppy Drive
- 32-bit Enhanced IDE HD Controller Up to 11MB/s Transfer Rates (2-3x faster)
- 2 Hi-Speed 16550 Serial Ports
- ECP/EPP Enhanced Parallel Port
- Medium Tower Case/230W UL PS
- Enhanced 101-key Keyboard & Serial Mouse

Multimedia System Features

- Double or Quad Speed CD-ROMs
- 16-bit Sound Card or Sound Blaster 16
- Pair of Speakers (Magnetically Shielded)
- Choose your own CD Bundle 10 or 14 CD Titles included ($700 Value)

See *MULTIMEDIA KITS*, last page for further description

Pentius 60 $1,399
Pentius 90 $1,699

Standard System Features plus:

- 4MB RAM on-board, exp to 128MB
- 425MB Enhanced IDE HD (540MB-Add $50)
- 12ms Access Time & 11MB/s Transfer Rate
- 64-bit PCI Super VGA Accelerator/1M
- 14" Super VGA Non-Interlaced Monitor (0.28) Low Radiation & Energy Star Power Saver

MULTIMEDIA SYSTEMS		PENTIUM 60MHz	PENTIUM 90MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	1599	1899
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	1629	1929
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	1799	2099
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	1899	2199

Maximus 60 $1,699
Maximus 90 $1,999

Standard System Features plus:

- 8MB RAM on-board, exp to 128MB
- 540MB Enhanced IDE HD (730MB-Add $100)
- 11ms Access Time & 11MB/s Transfer Rate
- 64-bit PCI Diamond Stealth 64 Accelerator/1M Super Fast 64-bit Graphics (39M Winmarks)
- 15" Flat SVGA Non-Interlaced Monitor (0.28) Flat Screen & Low Radiation

MULTIMEDIA SYSTEMS		PENTIUM 60MHz	PENTIUM 90MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	1899	2199
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	1929	2229
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	2099	2399
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	2199	2499

Colossus 60 $2,699
Colossus 90 $2,999

Standard System Features plus:

- 16MB RAM on-board, exp to 128MB
- 1.08GB Enhanced IDE Hard Disk
- 10ms Access Time & 11MB/s Transfer Rate
- 64-bit PCI ATI mach64 Accelerator/2M World's Fastest Graphics (42M Winmarks)
- Mag 17" Flat SVGA NI Monitor (0.26) Award Winning 17" Flat Screen Monitor

MULTIMEDIA SYSTEMS		PENTIUM 60MHz	PENTIUM 90MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	2899	3199
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	2929	3229
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	3099	3399
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	3199	3499

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SuperNote

THE PERFECT NOTEBOOK

SuperNote Features

- Intel 486 SX/33, DX2/50, DX4/75 & DX4/100 CPUs
- True 3.3 volt low-power design
- 4MB RAM on-board, up to 32MB
- 3.5" 1.44MB Floppy Drive
- 260MB 2.5" IDE hard drive, up to 810MB
- Two PCMCIA slots (Type II & III)
- 16-bit stereo sound card built-in
- New longer-lasting metal hydride battery
- EPA energy-star power saver compliant
- 32-bit local bus graphics with 1MB
- Large 9.5" active-matrix color, dual-scan color or mono screens standard
- Docking station with CD-ROM support available
- Integrated 19mm trackball w/wrist-rest
- Ultra-light 5.9 pounds including battery
- Compact 9.9" x 7.5" x 1.4" size

	486 SX-33	486 DX2-50	486 DX4-75	486 DX4-100
Monochrome	1479	1679		
COLOR Dual Scan	1949	2149	2399	2499
COLOR Active Matrix			3549	3679

UPGRADES AND OPTIONS

UPGRADE TO 8 MB	$190
UPGRADE TO 16 MB	$570
UPGRADE TO 340MB HD	$75
UPGRADE TO 540MB HD	$300
UPGRADE TO 810MB HD	$475
PCMCIA 9624 FAX MODEM	$99
PCMCIA 14.4 FAX MODEM	$199
PCMCIA ETHERNET ADAPTER	$159
PCMCIA 2MB FLASH CARD	$169
PCMCIA 4MB FLASH CARD	$329

COMPUTER SOURCE

IBM 486SLC2-66
$798.88

- IBM 486SLC2-66 CPU/Cpu Fan
- 64K External Cache
- 4 MB RAM
- 3.5" 1.44M Floppy Drive
- 213 MB IDE Hard Disk (Add $40 for 425MB)
- 32-bit VLB IDE-I/O HD/FD Controller
- 32-bit Super VGA Graphics Accelerator/1M
- 14" 1024x768 Super VGA Monitor (Add $30 for 14" SVGA Non-Interlaced)
- 2 Serial/Parallel/Game Ports
- Mini Tower Case, 101-key Keyboard & Mouse

FINANCE as low as $29* per month

MULTIMEDIA SYSTEMS		486SLC2 66MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	999
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	1029
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	1199
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	1299

Multimedia Systems Include:
2X or 4X CD-ROM · 16-bit Sound Card · Speakers · 10 or 14 Titles

INTEL 486DX2-66
$948.88

- Intel i486DX2-66 CPU/CPU Fan
- Pentium Overdrive Upgradable (P24T)
- 256K External Write-Back Cache
- 4 MB 72 Pin RAM, exp to 64 MB
- 3.5" 1.44M Floppy Drive
- 425 MB IDE Hard Disk (Add $50 for 540MB)
- 32-bit VLB IDE-I/O HD/FD Controller
- 32-bit Super VGA Graphics Accelerator/1M
- 14" 1024x768 SVGA NI Monitor (0.28dp) NON-INTERLACED/GREEN PC/LOW RADIATION
- 2 Serial/Parallel/Game Ports
- Mini Tower Case, 101-key Keyboard & Mouse

FINANCE as low as $35* per month

MULTIMEDIA SYSTEMS		486DX2 66MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	1149
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	1179
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	1349
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	1449

Multimedia Systems Include:
2X or 4X CD-ROM · 16-bit Sound Card · Speakers · 10 or 14 Titles

INTEL PENTIUM-60
$1268.88

- Intel Pentium-60 CPU/CPU Fan
- 256K External Write-Back Cache
- 4 MB RAM, exp to 128 MB
- 3.5" 1.44M Floppy Drive
- 425 MB IDE Hard Disk (Add $50 for 540MB)
- 32-bit VLB IDE-I/O HD/FD Controller
- 32-bit Super VGA Graphics Accelerator/1M
- 14" 1024x768 SVGA NI Monitor (0.28dp) NON-INTERLACED/GREEN PC/LOW RADIATION
- 2 Serial/Parallel/Game Ports
- Mini Tower Case, 101-key Keyboard & Mouse

FINANCE as low as $46* per month

MULTIMEDIA SYSTEMS		PENTIUM 60MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	1469
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	1499
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	1669
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	1769

Multimedia Systems Include:
2X or 4X CD-ROM · 16-bit Sound Card · Speakers · 10 or 14 Titles

PERFORMANCE, SERVICE & OPTIONS!

MORE PERFORMANCE

*Envision doesn't only have the lowest price on computers in town, it also has the **highest performance computers** in town utilizing the latest and best in **new computer technologies**.*

4X - QUAD SPEED CD-ROM

Quad-speed CD-ROM drives are now available in the entire lineup of Envision systems giving you a whole new dimension in multimedia performance. With 600KB/s Transfer Rates, they run twice as fast as regular double speed CD-ROM drives and 50% faster than triple speed CD-ROM drives for xtra performance.

MODE 3 ENHANCED IDE HD

*Many Envision systems now incorporate the newest in hard drive technology like **Mode 3 Enhanced IDE**. With **transfer rates** from **11 to 16 MB/s**, Mode 3 Enhanced IDE represents a new breed of hard drives designed for optimal performance. Running up to **3 times faster** than typical IDE drives and faster than even SCSI-2 drives, Enhanced IDE really gives you more bang for your buck.*

FAST 64-BIT GRAPHICS

*Many Envision Systems now feature **super fast 64-bit Graphics Accelerators**, which process video data **64 bits** at a time, for video performance that is more than **twice as fast** as normal 32-bit accelerators making them perfect for handling and processing complex graphics like CAD, desktop publishing graphics design and animation, and vector/raster graphics.*

MORE SERVICE

Envision also has some of the best service and support. At Envision, we feel that it the most important factor in choosing a computer is not the price or performance, but the place you buy it from. That's why our staff is dedicated to giving you the best service and support possible.

2 YEAR LABOR/1 YEAR PARTS WARRANTY

*All Envision Systems are backed with Envision's exclusive **2 years labor** and **1 year parts warranty** for piece of mind.*

GE Service Protection Plus Extended 4 Year Service Plans

*And for added piece of mind, you can add a **4 year on-site extended service plan** from **General Electric** - the nation's leader in high technology service and suport.*

96 HOUR BURN-IN TESTING

*All Envision Systems are run through Envision's comprehensive **96-hour burn-in** testing to ensure system integrity & reliability.*

ASSEMBLED IN THE USA

*Envision Systems are assembled right here in the **United States** at our Southern California computer factory using only the finest components made by such big manufacturers as **Intel, IBM, Conner, Teac, Sony, ATI, Diamond** and **Creative Labs**.*

CUSTOM CONFIGURATIONS

Envision has many different models to choose from but if you don't see the configuration that best suits your need, we would be happy to custom configure your system the way you want. Just ask your friendly Envision sales representative for more details on the many options that you can add.

FINANCING

Envision offers you many differents ways to buy an Envision computer. You can pay by cash, check, VISA, or MasterCard. Envision also has many different financing plans to fit your budget.

NO INTEREST 'TIL 1995

*You can select our 90 days same as cash plan which gives you up to **90 days** to pay for your computer **without paying any interest**! That means you'll pay no interest 'til 1995!*

MONTHLY PAYMENT PLANS

*You can also select our closed-end **financing plans** with terms of **up to 60 months** with reasonable monthly payments that won't break the bank.*

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8+ YEARS IN THE INDUSTRY

486 VALUESTATIONS

i486DX2 VALUESTATIONS

Standard System Features

- Intel 486DX2-66 MHz CPU/CPU Cooling Fan
- 8MB RAM on-board, exp to 64MB
- Energy Star Green PC Power Saver
- 256K L2 External Write-back Cache
- 3.5" 1.44MB Floppy Drive
- 540MB Enhanced IDE HD (730MB-$100)
- 11ms Access Time & 11MB/s Transfer Rate
- 32-bit Enhanced IDE HD Controller
- Up to 11MB/s Transfer Rates (2-3x faster)
- Medium Tower Case/230W UL PS
- Enhanced 101-key Keyboard & Serial Mouse

Multimedia System Features

- Double or Quad Speed CD-ROMs
- 16-bit Sound Card or Sound Blaster 16
- Pair of Speakers (Magnetically Shielded)
- Choose you own CD Bundle (see first page)
- 10 or 14 CD Titles included ($700 Value)

See ***MULTIMEDIA KITS*** on first page for full description

FINANCE as low as $48* per month

Ultima VLB $1,299

- 3 32-bit VESA Local Bus Slots
- 64-bit VLB Diamond Stealth 64/1M Super Fast 64-bit Graphics (39M Winmarks)
- 14" Super VGA Non-Interlaced Monitor (0.28) Low Radiation & Energy Star Power Saver

MULTIMEDIA SYSTEMS		486DX2 66MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	1499
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	1529
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	1699
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	1899

Performa PCI/VLB $1,399

- 3 32-bit PCI & 2 VESA Local Bus Slots
- 8MB RAM on-board; exp to 128MB
- 64-bit PCI Diamond Stealth 64/1M Super Fast 64-bit Graphics (39M Winmarks)
- 15" Flat SVGA Non-Interlaced Monitor (0.28)

MULTIMEDIA SYSTEMS		486DX2 66MHz
2X	STARTER 2X DOUBLE SPEED CD-ROM 16-BIT JAZZ SOUND CARD	1599
2X	EXPLORER 2X DOUBLE SPEED CD-ROM SOUND BLASTER 16 MCD	1629
4X	ADVENTURER 4X TEAC 4X CD-ROM (195MS) SOUND BLASTER 16 MCD	1799
4X	EMPEROR 4X TOSHIBA 4X CD-ROM (155MS) SOUND BLASTER 16 SCSI-2	1899

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Software Stocking Stuffers For Budding Young Animators

By Pamela Mason

Software Packages To Assist The Aspiring Animator

While drawing skill is not the only indicator of your potential for animation, it is often the common thread shared among successful animators. Chuck Jones, creator of the Road Runner and countless other cartoon characters, tells how as a young boy he inherited reams of letterhead stationary for sketching on from each of his father's spirited, but failed, business attempts. The Capital Children's Museum in Washington, D.C., currently has an exhibit called "Chuck Jones: An Animated Life." Terrence Rafferty in the *New Yorker* magazine writes, "Jones' drawings were never meant to be framed and nailed to walls, and, by rights, they should look forlornly inert there, like baseballs that were once propelled by Nolan Ryan or Bob Feller and now repose, lifeless and ordinary, in glass cases in Cooperstown. But, happily, for the Children's Museum, these pencil sketches are so bold and so dynamic that the figures in them appear ready to zoom right out of the frame."

Laying The Foundation

Kids who love to draw often fit the profile of the budding animator—they can be found crouched over their paper, drawing for hours—content to draw and color indoors on perfectly sunny days while other children play outside. To become animators, these children with an innate interest in art must take the next step and begin to develop a strong set of fine art skills: drawing, composition, color, and an understanding of perspective. These are best learned initially using traditional tools such as pencils, crayons, paint, and charcoal.

Software packages can be used next as an adjunct to traditional drawing. Like a pencil or paintbrush, software is another tool. It is not a substitute for talent. There are several software packages especially well suited to assist the aspiring animator.

Fractal Dabbler

Fractal's Dabbler is like an art school inside your computer. It is an excellent way to learn, or reinforce, the basics of drawing and painting. It has both online and manual art instruction using the venerable Walter Foster courses, *How to Draw, Volumes 1 and 2* and William F. Powell's *Color and How to Use It.* These are the classic step-by-step tutorials that have helped teach artists for many

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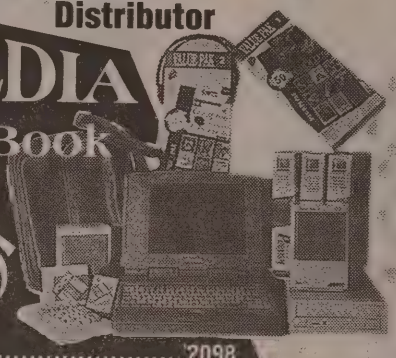

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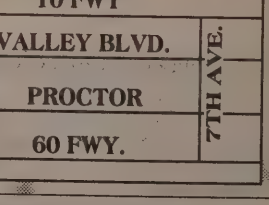

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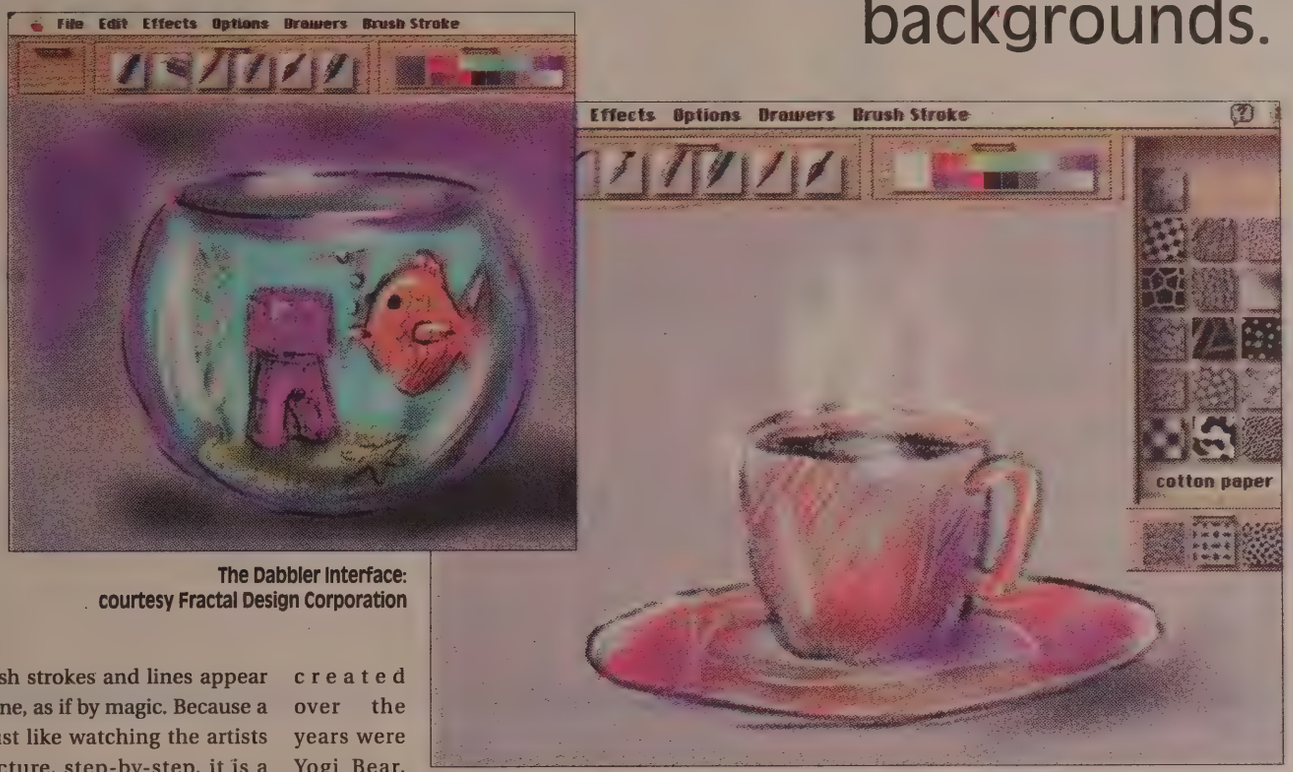
Budding Young Animators *continued*

years. Walter Foster explains, "If you would devote as much time as you do practicing writing, drawing an apple instead of writing 'apple' or drawing a flower instead of writing the word 'flower,' you will find that drawing becomes as easy as writing."

The eloquently designed Dabbler interface uses an intuitive tool drawer metaphor: just pull out whatever tools you need from a wood-grained desk drawer—pencil, pen, or marker. Choose the type of grain you want for your paper, open your sketchpad, and get to work! You hear the drawers opening and closing, markers make that familiar squeak, and a splash can be heard when filling an area with the paint bucket.



The Dabbler interface: courtesy Fractal Design Corporation

Dabbler's Recorder function is unique. Some of the lessons from the printed manual were recorded for playback as self-running tutorials to be viewed on the computer screen. The brush strokes and lines appear on the screen one by one, as if by magic. Because a recorded session is just like watching the artists actually draw the picture, step-by-step, it is a tremendous teaching tool that is especially valuable for art training, because art, by nature, is very fluid and dynamic. For example, a painting might start with a vague wash of color, building layers in increasing detail. This layering is difficult to capture on the static printed page. Dabbler also has fully interactive controls for playing back a session over and over, or it can be stopped to study a particular point, freezing the invisible hand in mid-stroke.

Dabbler runs under Windows, on the Mac and Power Mac. It works best with a pressure-sensitive stylus and tablet. Fractal offers an Artpak bundle that includes Dabbler and a special Wacom tablet for only $239, suggested retail price.

The stylus and tablet allow you to apply pressure so that you can draw with lighter or heavier strokes, like you would with natural media. A digitizer tablet also allows for tracing hand-drawn drawings into the computer. Both are important features for creating computer animation and art.

Hanna-Barbera Animation Workshop

The Hanna-Barbera studio brought the first cartoon series to TV in the '60s—*The Huckleberry Hound Show*. Some of the other characters they created over the years were Yogi Bear, the Flintstones, the Jetsons, Top Cat, Scooby-Doo, and Johnny Quest.

The Hanna Barbera Animation Workshop is for creating 2-D cel animations and is an especially good choice for a first animation package or for younger kids. Cel animation is basically a sequence of slightly varying still drawings, filmed over painted backgrounds. Throughout the manual are great introductory-level overviews of various animation topics. The workshop consists of two main areas: PAINT, where you paint backgrounds, and ANIMATE, where you create the characters. The interface is designed with large, easy-to-understand picture icons for the main modules. For adjusting speed, for example, you click on either a bunny or a tortoise.

Don't be deceived by the simple interface. With its onion-skinning feature (the ability to see through to the previous drawing, as if through tracing paper) you can create as elaborate cel animations as you like. It's not just for kids! Because it is so easy to use you spend more time animating rather than trying to figure out how to use the software.

Cel animation is basically a sequence of slightly varying still drawings, filmed over painted backgrounds.

The only real drawback to the package is that there is only one file format supported (.LBM), and the animation files are in a proprietary format. If you just want to work self-contained within this package, it's fine, but if you want to export files to other packages, or play animations outside the program, it is a limitation. Also included to study and learn from are sample animations of Scooby Doo, Yogi, Fred Flintstone, and a great dance sequence of George Jetson and his wife Jane dancing in (pre-cyber) space, in mid air, sans gravity. This package is fun, fun, fun!!!

Disney Animation Studio

Disney Animation Studio is also a 2-D cel animation program. It turns the computer into a studio that utilizes the same methods used in traditional animation studios: pencil drawing, onion-skinning, and ink and paint modules. A playback projector tool flips the drawings sequentially to test motion. Examples include a sack that seems alive and other classic characters like Tweedle Dee and Tweedle Dum from *Alice in Wonderland*. This program is easy to use. The manual is full of interesting historical asides on Disney animation, and it offers a lot of practical production tips. It includes a utility that

continued on page 214

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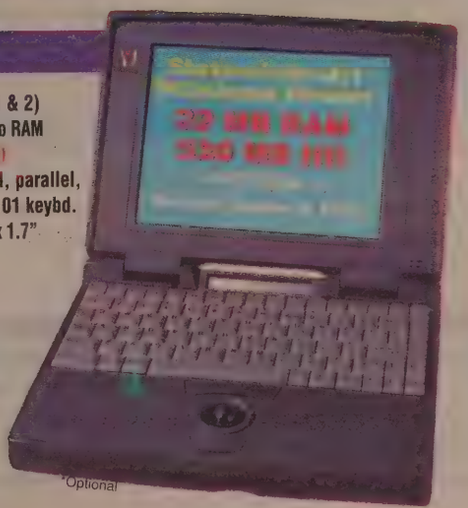

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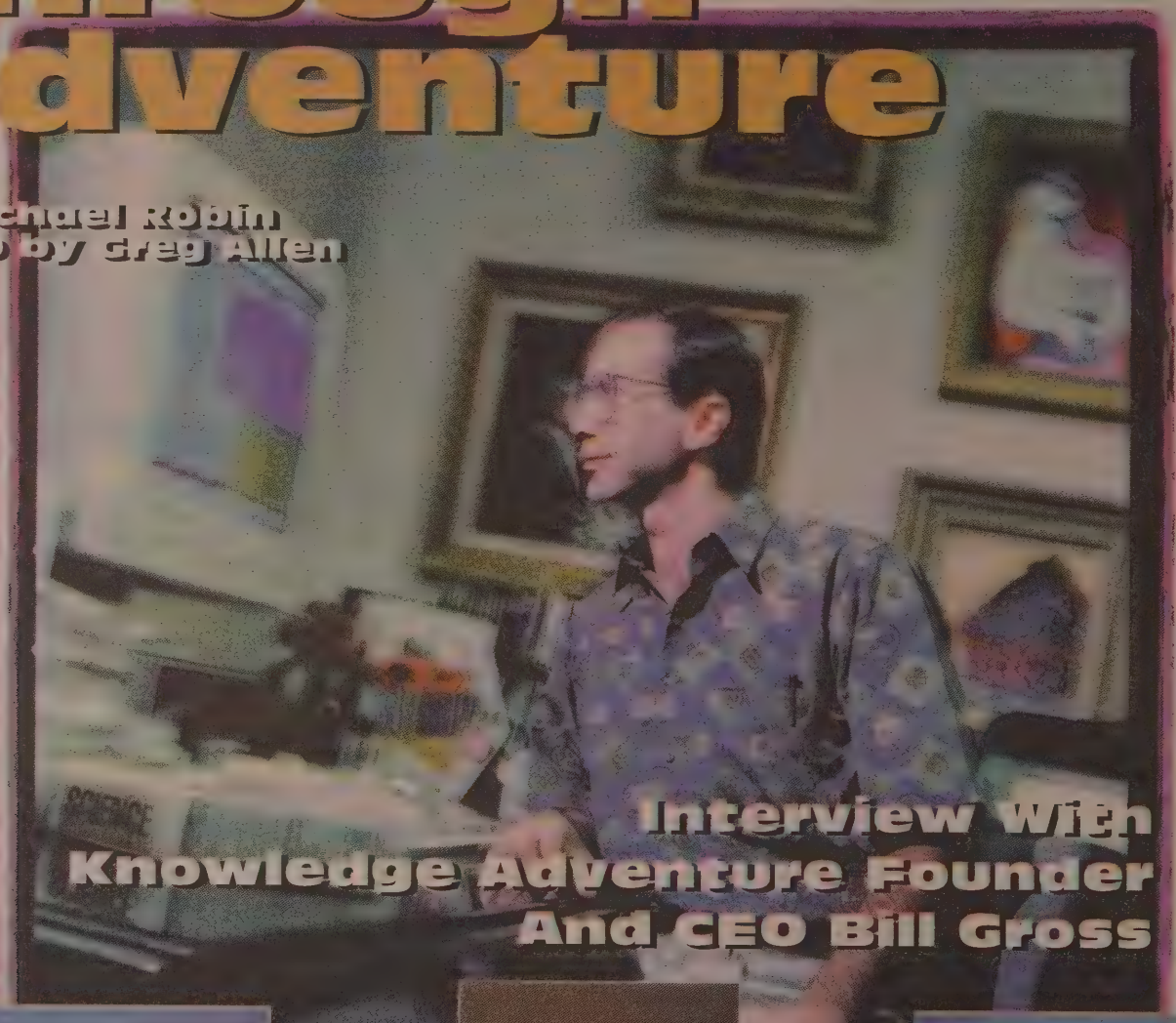
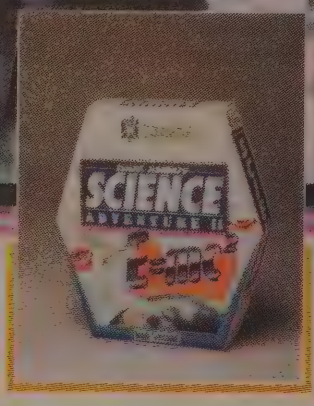
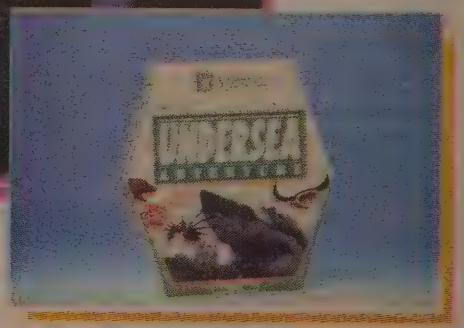


Interview With Knowledge Adventure Founder And CEO Bill Gross





in 1991, after close to a decade of developing business applications, independently and at Lotus, Bill Gross made a sharp career change to start Knowledge Adventure, an educational software company. The initial focus for the company has been to create software for kids ages three to twelve. Future plans include high school, college, and other adult education software.

By "enriching experience learning," explains Gross, Knowledge Adventure is "trying to make stuff that has positive values, gives goose-bumps of thrill and discovery, doesn't have any shooting or violence, and has a lasting effect on [kids] even after they turn the computer off."

Knowledge Adventure's products can be divided into several categories: Adventure, Reference, Creativity, and Games. The Adventure line explores particular topics of interest to young people. The Reference line, as the name implies, offers reference titles. The first product in this series, Random House

Kids Encyclopedia, is the result of a recent alliance with Random House. The Creativity line lets kids make or construct things. Magic Theater, for example, provides all the tools to make movies. Finally, the Games That Are Good For You line seeks to combine the elements of exciting game play that kids enjoy with the benefits of an enriching experience where they are learning.

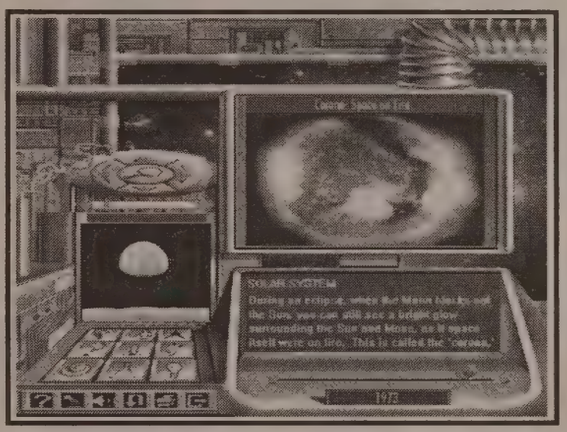
Creativity and hard work have brought Knowledge Adventure numerous awards. Last year, it won two Software Publishers Association Awards: Best Elementary Education Program for Dinosaur Adventure, and Best Secondary Education Program for Space Adventure. This year, after the success of the movie *Jurassic Park*, Microsoft also released a Dinosaur software title. Faced with this competition, Knowledge Adventure redesigned Dinosaur Adventure. The work paid off and the new 3D Dinosaur Adventure received the SPA award for Best Overall Education Program, and continues to be a very successful product.

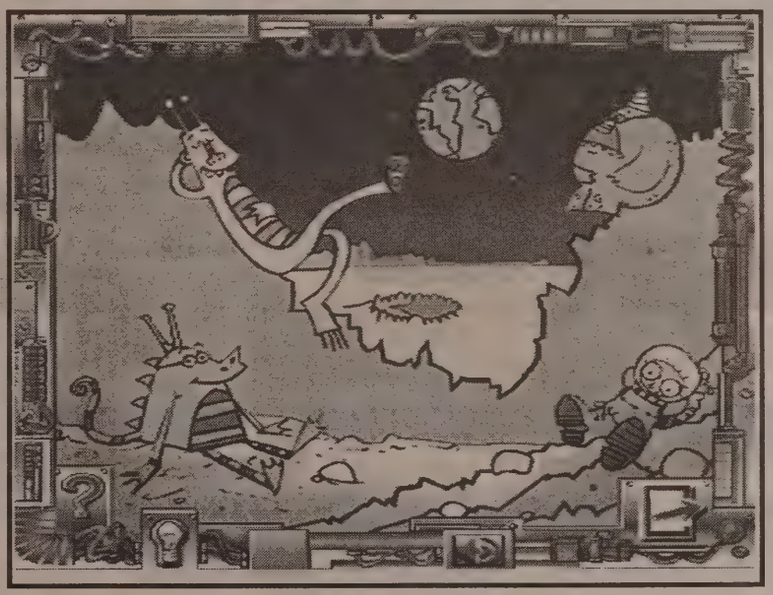
For this small company, 1994 has been a year filled with change. In addition to the awards it has received, Knowledge Adventure has tripled sales, hired a new president, formed a publishing division to work with other software developers, launched a subsidiary, Knowledge Adventure Worlds, signed a technology licensing agreement with AT&T, and established alliances with Random House and Steven Spielberg.

The moment you enter their office in La Crescenta (818/542-4200), near Glendale, it is apparent that this company is in the midst of tremendous growth. They have expanded to take over a building that was originally designed to hold a number of separate companies. The receptionist's desk sits in the middle of a hall, resting between the doorway that leads off to offices and the stairs to the second floor. Lining the hallways are doors resting on file cabinets, acting as desks. And, appropriate for a company that develops software for young kids, models of dinosaur skulls and space projects, world atlases, geography books, and an assortment of other kids' reference books and games lie on bookshelves throughout the offices

Knowledge Adventure is perhaps best known for its Adventure series of titles. Could you explain what you mean by Adventure?

Dinosaur Adventure, Undersea Adventure, Science Adventure, Space Adventure. These are products that take a specific subject that children are either very interested in or learn about in school, like dinosaurs, and by making the most exciting discovery product we can they get to learn facts and make new discoveries on their own. In Dinosaur Adventure this is done through an interactive encyclopedia that lets kids wander all over the earth and see where different dinosaurs lived. They can come up with new assessments about which dinosaurs were found near one another because of the globe in the program. They can see which dinosaurs lived in the same time period





through a timeline. Because there is full hypertext on all the images they can see how the legs of some dinosaurs looked similar and others looked different.

Rather than preach to them the facts about the dinosaurs, we try to make the content accessible in ways so they can make the discoveries themselves. For example, one child wrote to us because he noticed that the dots on the globe where different dinosaurs were found in the United States seemed fairly concentrated around the Rocky Mountains. We didn't program that in. It just comes out from the fact that for every dinosaur found a dot shows up on our globe. This child asked the question, "Is that because that was the only place in the United States where dinosaurs lived or just where they were found?"

That's a good question and the answer is a tough one. I think the correct answer is that dinosaurs lived all over the country, but the Rocky Mountains in a particular way preserved the fossils of dinosaurs so they happened to be found there.

Getting kids to ever dream up that question is what we are trying to make happen—to make them look at things in a new way and make a discovery like that. Maybe some paleontologist has already discovered that, but if a kid discovers that for themselves, they feel really powerful, and hopefully apply that looking for new ways to explain things to the rest of their life.

Are the exploring, experiential products what differentiate you from your competition, such as Brøderbund?

Yes.

Brøderbund makes some products that have the exploration and discovery, but they really make products that are more toward creativity. Kid Pix is a creativity product. Playroom and Treehouse are exploration and discovery products—not quite as much based on a subject as opposed to a bunch of activities.

The Learning Company makes mostly skill-and-drill products. They take subjects, like math and reading, to test and drill you. We have pretty much stayed away from that. There is a place for that but this is our differentiation. I really believe in getting children passionate about learning so they will take that passion elsewhere in their life.

Your products are called educational software, but it seems that they are predominately for the home as opposed to the school. Is that correct?

Almost all of our products are used in schools. Because the consumer market is relatively mature now, you don't have to go to the schools to get parents to be convinced to buy the products for the home. Ten years ago in the educational software business that was the only way to get started. We've entered the market late enough where the con-

sumer business has been relatively refined and improved. It is still not perfect. We sell a lot to schools, but schools don't have a lot of money. We feel we can reach more kids through homes than through schools right now.

Knowledge Adventure also targets young kids, the preschool market of three- and four-year-olds. Parents I have talked to have mixed feelings about this. Some discourage their young kids from using the computer, others really encourage it. What do you think the impact of such early use of computers is on kids?

I personally really encourage it. I definitely sound biased in saying that because we are a company that makes software for that market.

I started the company because I watched my son when he was playing with software, other companies' software. I really felt that it was a very valuable experience. When he was only three I saw him playing a product called Manhole, learning memory, cause-and-effect, planning. Many of these skills were valuable to him for preschool and kindergarten. He was very engaged in his ability to master those things, and to master them at his own pace. You could see a light bulb go on in his head if he discovered something. "Oh, I get it. To get back to that elephant I can follow these same steps." Even at his young age I felt the computer was providing something valuable for him and it was completely nonviolent.

I felt that was the very first step in great software for young kids. Now, if you could add some content, so there is actually material based on science or history, then it would be even more valuable. We would have the same thrill of discovery, the same power of navigation and control, but we would have real information in there.

I still feel that there is no reason not to have children as young as three, four, even five using computers. But like everything else, in moderation, maybe an hour a day balanced with going out in the real world and playing with things.

Before starting Knowledge Adventure you were at Lotus working on Magellan, doing mainstream, corporate business applications. That was a pretty big switch.

Definitely. I had only been in business applications my whole software career. I had done an accounting program in 1-2-3, called CPA Plus. We did HAL, which was a natural language add-on for 1-2-3. Everything I thought about of every waking moment of my business day was how to make business more efficient, and how to make a profit based on products that accomplished that. Lotus eventually acquired my company in 1985, and I was at

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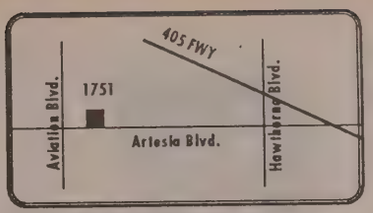

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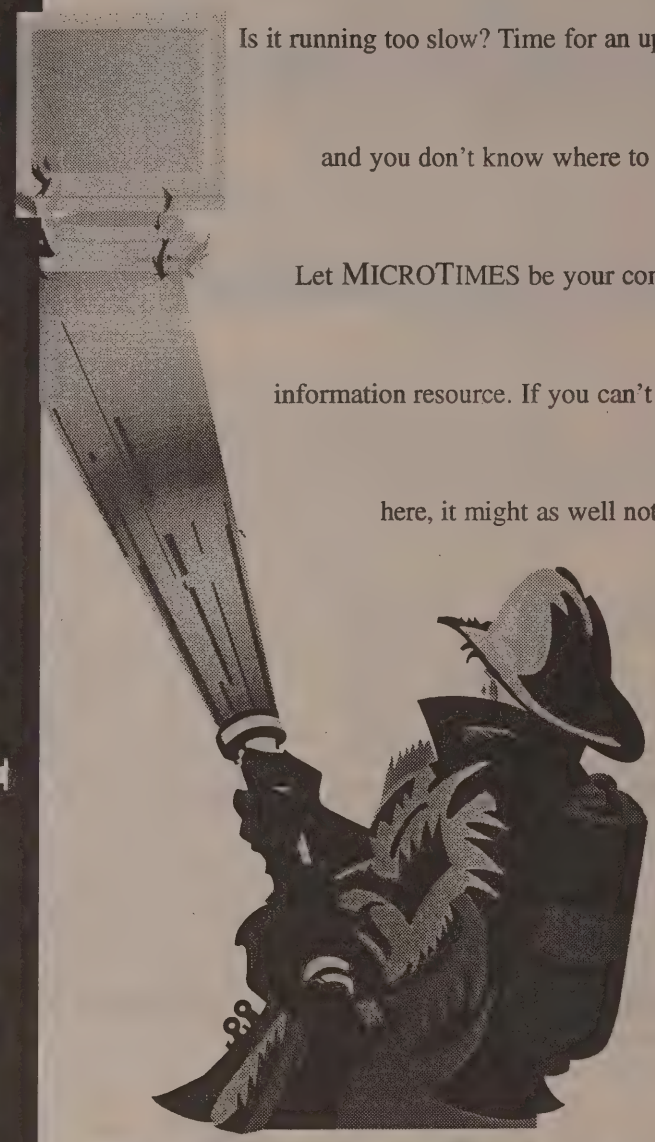

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Lotus for six and a half years. I would have been there forever but my son started kindergarten.

The day I drove away from the kindergarten, waving good-by to him on the playground, I knew that I had to do something in educational software. I felt I could make a bigger contribution in educational software than the remaining delta I could make to business software. The remaining productivity benefit I could get of 10 or 20%, which is huge, in a business product was nothing compared to the 500% I felt I could make in educational software. I never would have had that transition had it not been for my son David.

At the time, this was 1991, it seemed like the stupidest thing of all time. Everybody said, "Educational software is a dead business. CD-ROM is not taking off. You should stay in business software where the money is."

It all made sense to me. But I decided to do this for at least one year. I was willing to lose all my money for one year to make products for my son and for his generation. Then, in that same time period where I just accidentally did that because I felt that I had to, the business exploded. CD-ROMs started taking off. Multimedia PCs went from $3000 to $1000 and the home market took off. I didn't predict those things, it was just fortuitous. I really thought that it was going to fail, but I would at least make the product I wanted to make.

What experiences did you bring with you from Lotus? How did this shape how you run Knowledge Adventure?

What I learned at Lotus was everything about software quality, software quality assurance, software design, timetables, scheduling, division of labor on a software project, testing, bug-fixing, marketing, all the PR—everything about how to get a software product made and out. I also learned about small teams and collaboration.

What I didn't learn at Lotus, which I did pick up here, was how to blend content into software design. The one thing about business software is that the whole product is software. Here software is only half of the equation. Software is one part—it makes the product run. The other half is the content. Blending the teams of people who create those two very different parts of the product hopefully is the skill that gives us a competitive advantage. It is not easy to do and it is something I never expected—I didn't know that was even an issue when we started the company.

I assume your relationship with customers has also changed.

It's almost not fair, in a positive way, that we're doing something that parents care so much about. I used to talk to customers about Magellan, and they loved the product. But they didn't care emo-

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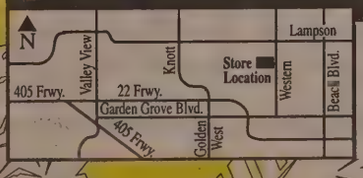

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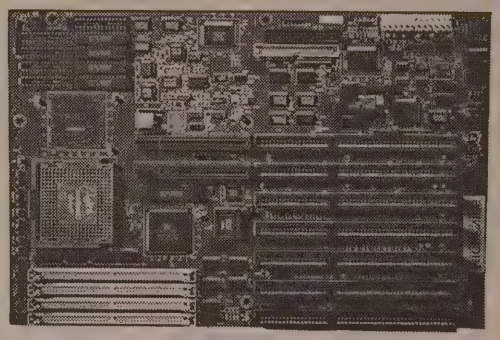

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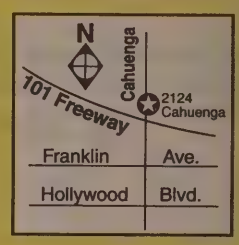

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tionally about it, how it's affecting their kids and if it was contributing to their life. It just helped them out in their business.

When we talk to our customers now we talk to a mom, or we talk to one of the kids themselves, they really really care about this. It matters to them a lot.

Similar to the PC industry in general, the market for educational software has matured. In the early '80s, when companies like Brøderbund and Sierra On-Line started, they were mostly family businesses. It's not that way anymore. Knowledge Adventure, for example, has some strong backers. Can the small, garage start-up happen anymore?

The garage start-up can still happen on the creativity side. I don't think it takes strong backers or a big company to come up with a great new idea. It helps, but it doesn't require that. I literally came up with my first idea in a garage. We grew out of my son David's bedroom at home until we overflowed the house, then took a small office until we overflowed that.

The maturing of the market that has made it hard for the garage start-up has not been the creation of the product, it's been the marketing and distribution. Right now, if you are a garage shop and come up with a great idea, it is very hard to get the retail stores to carry your product.

There are now so many titles competing for the small amount of shelf space that retailers are reluctant to take a title from a new company that only has one product. Retailers want to be able to return that product for others in the company's line if it doesn't sell well. They also want to know that there will be more products coming from that company in order to get economies of operation. So, it has become very difficult for a new, one-title company to make it. I think that situation can hurt innovation unless those companies team up with bigger companies for their distribution.

If someone comes to you with an idea, will you help them develop it?

Absolutely. Someone can come to us with an idea at any stage of development—a paragraph on a piece of paper or a complete tested product. The difficulty of coming to us with just an idea on a piece of paper is that we have more ideas on pieces of paper than we have people to execute them. A lot of the difficulty in making a great multimedia product today is not the ideas, but is in building a team and actually doing the work to make it happen. We love to help people build those teams, and we would support people to do that or we would do it in house. But right now, as in any bursting-at-the-seams business, there are more ideas than we can handle.

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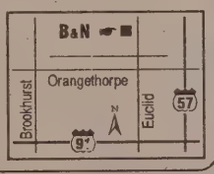

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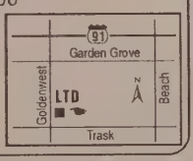

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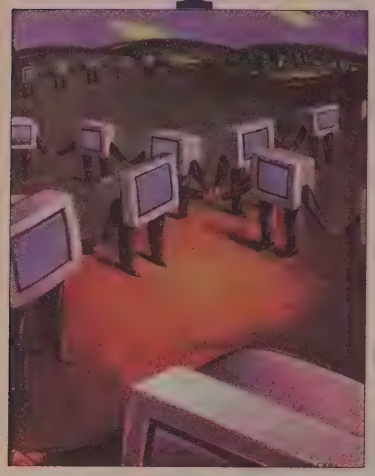
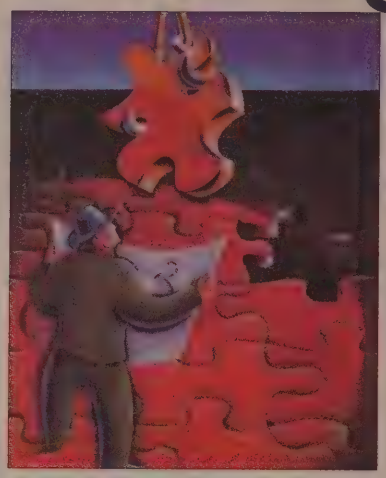
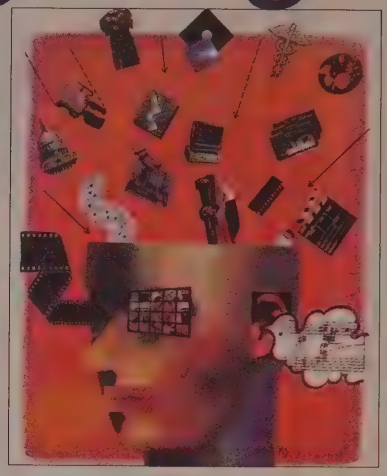


Network utilities—vital, but set aside 100K



DOS 6 utilities—handy, but about 120K



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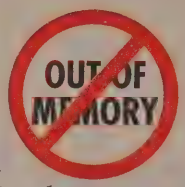

Conventional memory runs into a wall whether you have one megabyte in your PC or 16. And even MemMaker, the utility that comes with DOS 6, just hasn't kept up with demanding users.

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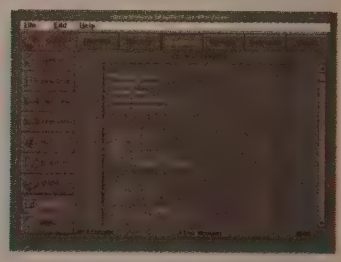

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The Discoverers, by Daniel Boornstin, Librarian of Congress Emeritus, is a great book. Your product, based on the book, seems different from your others. For instance, it includes the entire IMAX movie. Also, it does not necessarily strike me as something for little kids.

That product is probably geared toward ages ten and up. That would confine us to the ten- to twelve-year-old part of our audience. Certainly, it is a very serious work. While a ten-year-old can appreciate it, adults can enjoy it as well.

In this case we took a really fantastic book that was turned into a fantastic IMAX movie, and made it interactive by allowing you to branch out from the movie. The producer of that product, Roger Holzsberg, experienced his daughter at the movie continually leaning over to him and saying, "Dad, what's going on there?" "How come they are doing that?" "What is that about?" He wanted to make a product that would allow her to interrupt a movie at any point, explore, and get those questions answered, rather than having to say "shush, shush," during the movie in the middle of the IMAX theater.

Some of the IMAX movies are so tremendously educational it is a shame to make them stop at forty-five minutes when there can be ten hours of exploration. His vision was to make a product that was forty-five minutes long and ten hours wide. He achieved that by taking that movie and adding all the other interactive elements to it.

Along with Venture Capital backing, you have entered into several alliances this year, most recently with Steven Spielberg. How did you two meet? Is anything happening yet?

We actually met very accidentally. He bought one of our products, 3-D Body Adventure, for his kids and fell in love with the product. He thought some of the 3-D stuff we did was incredible, but immediately also thought, "What would it be like if you took all this educational material but actually added a story to it? Made the body come alive and become a character to draw you through it? Didn't rely just on children's curiosity to take you through it, but actually made it compelling to go through because of a story line?"

He contacted us. Told us that, and we said, "Of course, that would be incredible. We don't have the mastery of storytelling, but we do have the mastery of technology. Why don't we talk about doing something together."

When we first met, our ideas were exactly in line. He really wants to do anything possible to help humankind, to help kids, and to have fun personally at the same time. We offered an opportunity to do all those things in products that we could brainstorm about together.

Our first idea was to take each of our products and have him brainstorm things to make them more compelling. The second idea was to make new products together, new ideas not confined to adventure products. That led to him investing in the company and collaborating with us on a series of products which we will be coming out with next year.

The technology you use has also attracted a lot of attention and various license agreements, including AT&T and Paramount. Tell me a little about this technology and when we may see the results of this.

We believe that technology is a very important component for a really powerful interactive experience. Some people say that content is everything, some people say that technology is everything. We believe they are both important.

For us, unlike a movie that you watch in a theater or a videotape you play back on your VCR, the technology can influence the playback machine, which in this case is the computer. On a VCR when you play a tape, it is all content. The tape can't enhance your VCR to do something it couldn't do otherwise. Whereas when we ship a CD-ROM, we can ship a 600MB CD-ROM with 599MB of content and 1MB of executable code that can actually enhance the player and give us an unfair advantage over someone else. Because of that the technology is very important.

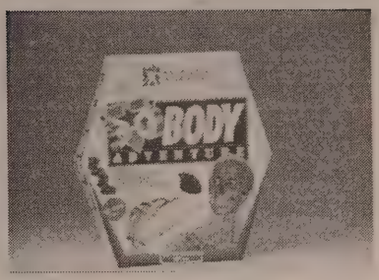
We have concentrated on creating compression technology, 3-D technology, virtual reality technology, and searching technology trying to do anything that will create an unfair advantage and make the experience better. We continually invest in developing the technology as opposed to using off-the-shelf tools. We have a team of Cal Tech programmers creating new technology to make our products.

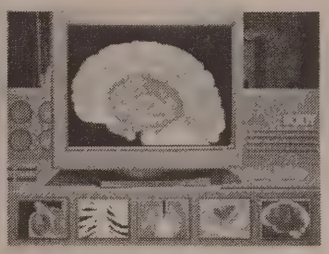
We are willing to push the technological barriers if it allows us to do new ways of storytelling or new kinds of experiences. In the course of doing that we are also willing to license that technology and partner with other people to make that technology have a more widespread base and to help leverage the cost of developing that technology.

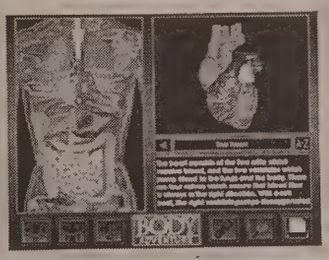
Who are the licensing agreements with?

AT&T is working with us on some of the interface technology to make 3-D worlds that might potentially happen online. We use some of that technology in some of the games inside our products, but we think it can also be used very beneficially in a 3-D environment that would be online with multiple users.

The compression technology that allows us to put more hours of movie on a CD-ROM than anybody else might be licensed to other people as well.







Is online one of the areas where Knowledge Adventure is heading?

I believe that online is going to take over the world. It doesn't matter if it does or not because some other form of delivery will take over the world. We can't control which one it is, but we have to be prepared for whatever it is. Again, our goal is just to make compelling stuff and then reach a lot of people.

Three years ago when we started, the way to reach a lot of people was to use our compression technology to deliver a multimedia experience on floppies. Today, CD-ROM is a delivery vehicle that can reach a lot of people. In two years, the Internet might be the way to reach everybody in America. If it is, we will make our experiences there.

One of the huge advantages of online, aside from unlimited quantity of information access, or from not having to physically distribute a piece of plastic, go to the store and buy a lot of cardboard around that piece of plastic, is that the experience can change. It can be backed up by other live people, as opposed to a computer. You can't make an algorithm for a computer game that is as good as a real human being on the other end. In some ways that implies competition, and online can make a better environment for competition than can ever happen with a standalone computer. But I think online can also make for better collaboration than can ever happen alone. We want to make products

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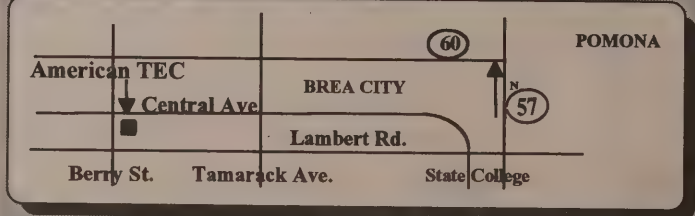

that have online collaboration possibilities where fifty or a thousand, or just two, people can get together and do something that cannot be done alone—and have a better experience because of that. We want to invent those kinds of products.

Is this where Knowledge Adventure Worlds fits in?

Knowledge Adventure Worlds is a subsidiary of Knowledge Adventure, and is focusing on the 3-D, online worlds. They are the ones working with AT&T.

Knowledge Adventure Worlds is based in Washington, D.C., closer to a lot of the telcos and cable companies because of lot of the things that will be going on online won't be happening from Los Angeles.

There has been a lot of growth and change for Knowledge Adventure this year. Last month you hired a new president. What role will she play?

We have grown to the point where the organization's rate of change needs as much experienced management in that kind of growth as possible. We were very fortunate to be able to recruit Ruth Otte, who was the president of the Discovery Channel. She had managed the growth of Discovery Channel from several million subscribers to sixty-two million subscribers, from a couple million dollar company to a hundred million dollars, and from twenty-nine people to five hundred people. All the same problems of growth that we are having, she has been through.

In addition to her ability to manage that kind of growth she also has insights into where the delivery method will happen in the future over cable that will really benefit Knowledge Adventure if that ends up being the way that interactive gets distributed to the home.

A look around your offices and you can see how fast everything is changing—wires strung everywhere, desks lining the halls. How much is the feel and vitality of the company changing, and how much is this change impacting what you believe is the right way to keep the company nimble?

Nimbleness in this business is one of the most important things because everything is changing so fast. It definitely gets harder as we grow. It is much easier to be nimble with ten people that it is with 150 people.

The way we have combated that is by breaking into very small teams, usually no bigger than ten people, and by keeping everybody in pretty close physical proximity. Although that makes the surroundings tight, it keeps the communication very high. People are not in closed, private offices. People are sitting in the thick of things with teams that are very connected to what is happening with other teams as well as with their own team members.

As we continue to grow this is going to be a very difficult problem and we plan to address it by emulating everything that worked for us when we were small as opposed to trying a new model.

Last winter, after a significant push to finish several new products, you took everyone for a three-day skiing holiday to Yosemite. Is that still possible now that the company is twice as large?

We actually took everybody to Mammoth for a three-day ski trip. We rented buses and got lodges right near the lifts. It was a great time for the whole company. We had sixty people in the company but about 150 people went because we invited the whole family.

This year after the crunch we have 150 people, that probably means three hundred or 350 people on a trip like that. It will be more difficult, but we definitely will do it. It was such a bonding experience for the whole company, and such a great reward for all the hard work.

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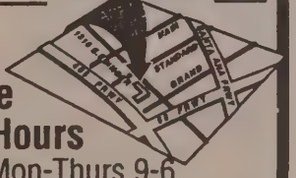

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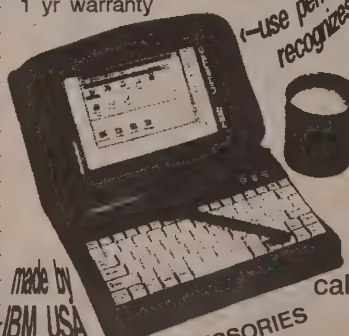

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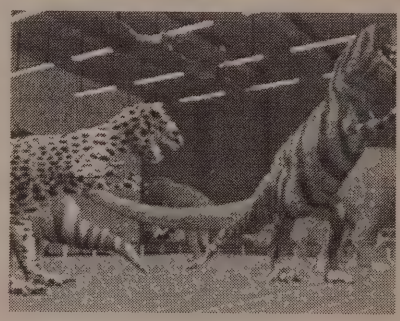

How do you keep that control with VC investors? Losing that degree of control seems to be the usual fare in this industry.

Two ways. One is that our outside backers have fully supported the methods and implementation we have had at this company. They haven't come in and said, "You need to do it this way because we are backing you." They have come in and said, "We think you know what you are doing and we don't want to mess with any of it." We have been very lucky to find people with that open minded of a view.

The other way we have been able to do this has been numerically. Everyone in the company has equity. That has been a great moral and spirit builder, but it has also made it so that there is a significant amount of equity controlled by the actual employees of the company, such that the backer can't dictate to us how to run the company.

New employees still have their choice of equity vs. pay?

Every employee in the company has the choice of lower salary with more equity or a higher salary and less equity. That gives everyone the chance to make their own personal trade-off of what they can afford.

What would you summarize as your keys to success during these difficult economic times?

Sharing the equity with everybody in the company has been a critical thing for success in this business. Definitely being passionate about what you are doing. I think the only reason we succeeded is because we all care so much about what we are doing. This is a very tough business to be in, even though it's growing fast there are a lot of tough competitors. I don't think we would have had the stamina to compete if we weren't passionate about the actual products we were creating. I would say that another area of success is being in an industry that is growing very fast, but for us that was just a lucky guess. We didn't really plan that. And for us it's been a great success to continually go back and refine our products and make them better and better each year. But to me, I feel that is kind of obvious. I wouldn't really recommend that as something that you need to do for success. If you don't do that you can't even think about succeeding. ■

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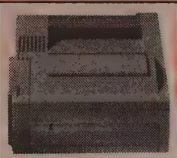

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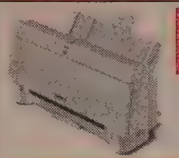

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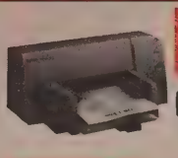

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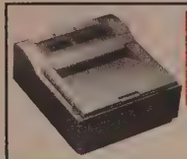

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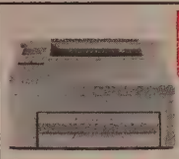

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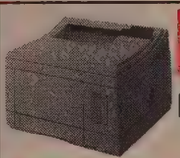
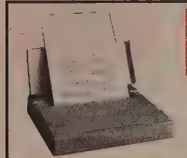


$1469.65

HEWLETT PACKARD

HP LaserJet 4Plus Printer #36-10461

- 600 dpi resolution
- Fast 12ppm printing
- Standard 350 sheet capacity max. 850 sheets
- 45 scalable typefaces
- 2MB upgradable to 66MB
- Enhanced HP PCL-5
- Optional duplex printing
- Resolution Enhancement Technology



$239.55

Canon

BJ-10SX Portable InkJet Printer #97-10055

- 360 dpi resolution
- 110cps printing
- Single sheet paper-handling with optional 50 sheet paper feeder
- Meets EPA energy conservation guidelines
- Two-year limited warranty

$499.76

Authorized Reseller

Apple® Color Stylewriter® 2400 #97-10079

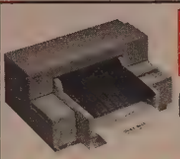
- 360 x 360 dpi
- 3ppm B&W printing
- Compact desktop design
- 64 scalable TrueType® and PostScript fonts
- Brilliant color outputs
- One-year warranty

$399.75

Panasonic

Panasonic KX-P4400 #36-10477

- 300 dpi resolution
- Prints 4ppm
- 512K upgradeable to 4.5MB
- 28 fonts
- Compact design
- One-year limited warranty



$489.55

HEWLETT PACKARD

HP DeskJet 560C Inkjet Printer #97-10053

- 600x300 dpi resolution
- Up to 3ppm printing
- Prints up to 16.7 million colors
- 14 scalable typefaces
- 6 bit mapped fonts
- 100-sheet paper capacity
- Built-in ColorSmart technology
- Three-year warranty

$229.95

Canon

BJ-200e InkJet Printer #97-10049

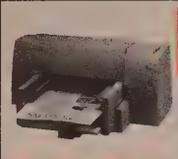
- 360 dpi resolution
- 4ppm printing
- Quiet 42 decibel printing
- 100-sheet paper capacity
- Manual feed
- 20 TrueType® fonts
- 15 envelopes in sheet feeder
- Two-year limited warranty

$399.55

Canon

BJC-4000 #97-10063

- 360x360 dpi color
- 720x720 dpi B&W
- 16.7 million colors
- Two-year limited warranty
- Prints on plain and coated paper, transparencies and back print film
- Up to 5ppm printing



$296.46

HEWLETT PACKARD

HP DeskWriter 540 Printer #97-10075

- 600x300dpi with HP's Resolution Enhancement
- Color with optional kit
- Up to 3ppm printing
- 35 TrueType® fonts
- Prints on postcard to legal paper
- Macintosh® compatible
- Three-year warranty

Dot Matrix Printers

Epson LX-300 Color #98-10009 ..... $165.77

Okidata ML-320 #98-10007 ..... $283.99

Inkjet Printers

Hewlett-Packard DeskWriter 320 #97-10076 ..... $369.55

Hewlett-Packard DeskWriter 560C #97-10052 ..... $459.55

Hewlett-Packard DeskJet 1200C #97-10005 ..... $1319.95

Hewlett-Packard DeskJet 1200CPS #97-10008 ..... $1999.74

Laser Printers

Apple® StyleWriter® Portable #97-10006 ..... $375

NEC SilentWriter 610 #36-10457 ..... $399.75

Apple® LaserWriter® Select 300 #36-10437 ..... $549.55

Okidata OL-410e #36-10454 ..... $679.86

NEC SilentWriter 640-Mac #36-10456 ..... $719.55

Okidata OL-410e/PS #36-10465 ..... $899.75

Hewlett-Packard LaserJet 4ML #36-10446 ..... $989.85

Printers Accessories

Butler Premium Copy Paper 500 sheets #34-10847 ..... $3.23

Allsop CD-ROM Caddy #40-10445 ..... $8.23

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Hewlett Packard Toner for Laser Jet #34-10866 ..... $99.13

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Microsoft

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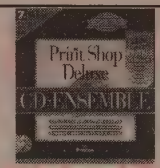
Lotus 1-2-3 5.0 Upgrade for Windows is the simple way to create spreadsheets. It increases productivity by combining simplicity, usability and power!



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The **Print Shop Deluxe CD Ensemble** features the most popular Print Shop Deluxe programs on one CD! They include everything you need to create great-looking printed pieces.

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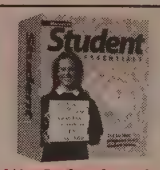
Excel 5.0 Upgrade For Power Mac® #74-10153

Microsoft Excel 5.0 Upgrade for Power Mac automates and simplifies routine tasks, while drag and drop editing makes cross-application use easy.



$89.96

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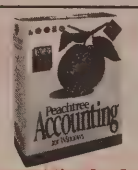
A Must For Every Student! #78-10347

Student Essentials Pack for Mac is a complete collection of Macintosh software that will make any student's schoolwork easier!



$99.96

Peachtree

Accounting's Never Been Easier! #52-10197

Peachtree Accounting 3.0 for Windows provides everything you need to run your small business — from general ledger features to custom forms design.

$129.94

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Drag & Drop Drawing For Every Desktop! #55-10480

Visio is the perfect program for business graphics! More than 750 SmartShapes and over 20 job-specific stencils help create professional-looking drawings and diagrams — and you never have to draw a thing!

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Create Professional-Looking Documents! #78-10356

WordPerfect 6.1 Upgrade for Windows combines powerful word processing, drawing, charting, spreadsheet functionality within tables, and direct integration features in one!

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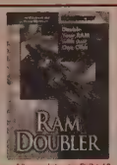

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Double Your Mac's RAM! #76-11354

RAM Doubler for Macintosh and Power Macintosh doubles your system's memory with the click of the mouse. It's fast and easy to use, plus it works with a range of Mac software.

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PFS: Business Plan, for Windows, is an integrated program designed to make your business plan easy to write and impressive to read. It features a word processor, spreadsheet and charting functions.

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It's Legal 5.0 for Windows lets you prepare your own legally binding documents. You get 53 customized personal and business documents. Easy-to-use icons put the law at your fingertips!

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Sidekick is the all-in-one personal organizer that's fast, functional and friendly. It helps you stay on top of everything you've got going.

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MacDisk, for PC, provides instant access to any Mac® file using your favorite PC applications. This utility lets you read, write, and format high-density Mac® disks.

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SYMANTEC

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For Mac/Windows Win#76-11321/Mac76-11320 $46.42
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Print Cache 3.12 #76-11221 ..... $49.84
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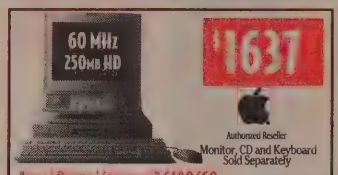

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Apple® Power Macintosh™ 6100/60 #12-10464

- PowerPC™ 601 RISC microprocessor
- 60MHz
- 8MB RAM
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- Eight built-in ports
- 32K cache
- Built-in floating-point math coprocessor

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Compaq Presario 720 CDS #12-10451

- 486SX2/66 processor
- 4MB RAM
- 420MB hard drive
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- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS-Works, Encarta, Windows and more!

Monitor sold separately

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- Intel™486SX2/50 processor
- 4MB RAM
- 340MB hard drive
- Fax modem
- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS Works, Navigator, Windows and more

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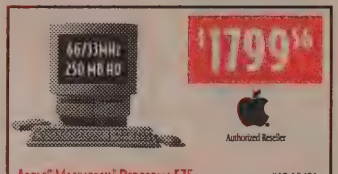
TOSHIBA

T-1910 Notebook #23-10206

- 486SX 33 processor
- 4MB RAM
- 120MB hard drive
- 9.5" Vivix™ monchrome display
- Pre-loaded software includes MS-DOS and Windows
- Integrated trackball
- Nickel hydride battery



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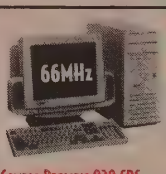
Apple® Macintosh® Performa 575 #12-10481

- 66/33MHz Motorola 68LC040 microprocessor
- 5MB RAM
- 250MB hard drive
- Fax modem
- 14"Sony Trinitron™ color monitor(13"VSS)
- Keyboard and mouse
- Internal CD-ROM drive
- PowerPC™ upgradable



$1696.33

COMPAQ

Compaq Presario 920 CDS #12-10469

- 486SX2/66 processor
- 8MB RAM
- 420MB hard drive
- 14.4 data/fax modem
- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS-Works, Encarta, Windows and more!

Monitor sold separately

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Canon

Monitor Sold Separately

Innova Media 450 #12-10456

- 486DX2/50 processor
- 4MB RAM
- 420MB hard drive
- 16-bit sound card
- Fax modem
- Dual-speed CD-ROM
- Software includes MS-DOS, Lotus Smart Suite, Encarta,Windows and more!

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NCR
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Dual Scan Color #23-10219

- Intel486™ SX/25 MHz processor
- 4MB RAM
- 170MB hard drive
- 9.5" STN color screen
- 1MB video memory
- Integrated trackball
- Local bus video
- 1 PCMCIA type II slot

$2699.55

Authorized Reseller

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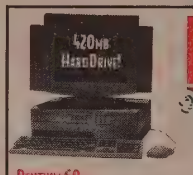
- 60 MHz PowerPC™601 RISC Processor
- 8MB RAM
- 350MB hard drive
- Double-speed CD-ROM
- 16-bit sound card
- Stereo speakers
- 15" Monitor (14.2 Viewable Screen Size)
- Includes $900 of software

$1696.37

COMPAQ

Compaq Presario 320 CDS #12-10450

- 486SX2/66 processor
- 4MB RAM
- 420MB hard drive
- 14.4 data/fax modem
- 16-bit sound card
- 14" color monitor (13" Viewable Screen Size)
- Dual-speed CD-ROM
- Includes $850 of software



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Packard Bell

Monitor Sold Separately

intel inside pentium

Pentium 60 #12-10430

- Intel Pentium 60MHz processor
- 8MB RAM
- 420MB hard drive
- 14.4 fax modem
- Double-speed CD-ROM
- 16-bit sound card and stereo speakers
- Pre-loaded software and multimedia titles

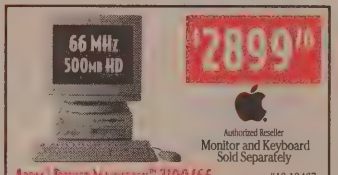
$1999

TOSHIBA

Color Screen!

T-1910CS Notebook #23-10205

- 486SX 33MHz processor
- 4MB RAM
- 200MB hard drive
- Internal PCMCIA slot
- Pre-loaded software
- includes MS-DOS and Windows
- Integrated trackball
- Nickel hydride battery
- 9.5 Dual-scan display



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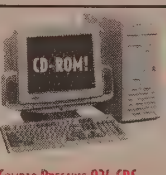
Authorized Reseller
Monitor and Keyboard Sold Separately

Apple® Power Macintosh™ 7100/66 #12-10467

- PowerPC™ 601 RISC microprocessor
- 66MHz
- 8MB RAM
- 500MB hard drive
- Built-in CD-ROM drive
- 1MB VRAM
- 32K cache
- 16-bit stereo sound
- Stereo Speakers



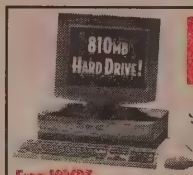
$1896.37

COMPAQ

Compaq Presario 924 CDS #12-10453

- 486DX2/66 processor
- 8MB RAM
- 525MB hard drive
- 14.4 data/fax modem
- 16-bit sound card
- Dual-speed CD-ROM
- Software includes MS Works, Encarta, Windows and more

Monitor sold separately



$2599.34

Packard Bell

intel inside

Force 108CDT #12-10431

- Intel™ Pentium 90MHz processor
- 8MB RAM
- 810MB hard drive
- 14.4 Fax modem
- 1MB PCI Local Bus Video
- Software includes Navigator, Windows and much more

Monitor Sold Separately

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COMPAQ

Color Screen!

Compaq Contura 400c #23-10240

- 486DX2/40 Processor
- 4MB RAM
- 250 MB Hard drive
- 2 PCMCIA Type 2 slots or 1 Type 3 slot
- 9.5" Dual-Scan Color screen
- Includes: MS-DOS, Windows, Lotus, MS-Works, AOL and more.

Apple® Performa® 475
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Pentium 60MHz #12-10477 ..... $2099.35

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Pentium 90MHz #12-10476 ..... $2599.35

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Packard-Bell Force 57CD
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Pentium 60 MHz #12-10454 ..... $2299.57

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Pentium 100MHz #12-10495 ..... $2999.53

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486SX33 #82-10025 ..... $1796.75

Toshiba T1960cs
486DX2/50 #23-10223 ..... $2399.00

NCR Active Matrix Color
486SLC33 #23-10218 ..... $2799.35

Toshiba T1960ct
486DX2/50 #23-10222 ..... $2999.00

Texas Instruments TM4000M
486DX2/50#23-10226 ..... $2999.37

Toshiba T2400ct
486DX2/50 #23-10245 ..... $3599.33

Texas Instruments TM4000M
486DX2/50 #23-10247 ..... $3899.55

Texas Instruments TM4000M
486DX4/75 #23-10246 ..... $4799.55

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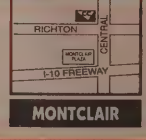

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DOS/Windows

Modems

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US Robotics

28.8 V.34 Internal Modem #31-10354

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Internal Modem #31-10345 ..... $19
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PCMCIA 2400/9600 #31-10349 ..... $34
Compaq
PCMCIA 2400/9600 #31-10330 ..... $49
Prometheus
14.4 Internal Fax Modem #31-10336 ..... $59.57
Best Data
14.4 Internal Fax Modem #31-10311 ..... $69.77
Digicom 19.2/9600
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PCMCIA Fax Modem 14.4 #31-10259 ..... $249.53
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Z-RAM

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4 MB 1x36 PS/2 #28-10340 ..... $179.95
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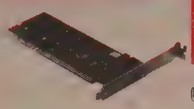
8 MB Deskpro, Prosignia #28-10317 ..... $379.55
8 MB Prolinea, Prosario #28-10373 ..... $399.56
16 MB 4x36 72pin #28-10395 ..... $749.45

Networking



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LINKSYS

Ethernet 16 #22-10239

GVC Ethernet 10BT Adapter #22-10178 ..... $49.55
Belkin 1,000ft Level 4 PVC #39-10056 ..... $89.93
GVC Pocket Ethernet Combo #22-10176 ..... $149.66
Linksys PCMCIA Ethernet Card #22-10237 ..... $169.35
GVC 8 Port HUB #22-10180 ..... $169.55
Artisoft Lantastic Starter Kit #22-10163 ..... $169.56
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10Pk RJ45 #10-10349 ..... $2.99
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Boca Network Card #22-10213 ..... $39.55
Linksys Multishare #39-10041 ..... $89.45
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Xircom Pocket #22-10181 ..... $329.67

Input

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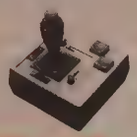
NMBT Keyboard #21-10054 ..... $29.43

$9.53

PRECISION INSTRUMENTS

PINS Mouse #30-10264

APT Mouse #30-10247 ..... $11.77
PINS Trackball #30-10265 ..... $29.53



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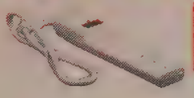
CHPR Mach III #30-10194

IBM Flight #30-10251 ..... $34.99
ThrustMaster #30-10193 ..... $59.55
APT Best Trackball #30-10234 ..... $29.65
APT Best Pen #30-10246 ..... $25.45
Microsoft Home Mouse #30-10270 ..... $39.35
Kensington Expert #30-10196 ..... $78.55

Power Supply



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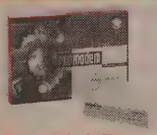
Tripplite Super 7 #35-10141

Proxima Office Surge #35-10150 ..... $3.99
Surgemaster II #10-10328 ..... $24.23
Silver 200 #35-10176 ..... $28.53
Gold 2000 #35-10171 ..... $44.55
Trip Backup 250 #35-10129 ..... $99.44
Trip Backup BC-400 #35-10142 ..... $159.44

Macintosh

Modems



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Prometheus

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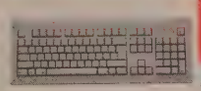

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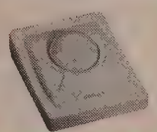
COMPUTER City

Computer City Extended Keyboard #21-10053

Apple® Extended Keyboard #21-10016 $159.55



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KENSINGTON

Kensington Expert Mouse #30-10196

PINS Trackball #30-10261 ..... $39.53
Costar Stingray #30-10260 ..... $59.35
Apple® Mouse #30-10144 ..... $79.76
Turbo Mouse 4.0 #30-10131 ..... $109

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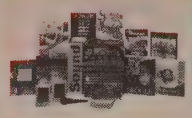
Multimedia Kits



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Discovery 16 #33-10199

- Digital School House #33-10246 ..... $299.65
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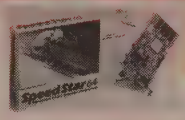
Multimedia Uses Lots of Hard Drive Space! See our Hard Drive Page For Upgrades!

Video Cards



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DIAMOND Computer Systems, Inc

Speedstar 64 ISA 1MB VRam #15-10230

- Speedstar Pro VL 1MB DRAM #15-10239 $119.66

Computer City

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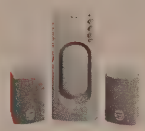
- Labtec CS-600 #94-10026 ..... $29.53
- Labtec CS-1400 #33-10174 ..... $79.43



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SONY

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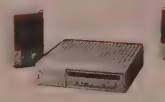

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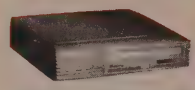
NuDesign 2x Multimedia Kit #33-10260

$449.37

Apple® Multimedia Kit #33-10212



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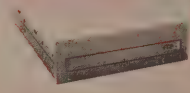
- Turtle Beach Monte Carlo #92-10008 .. $99.75
- Turtle Beach Tropez #92-10007 ..... $249.65
- Reveal FM Tuner #33-10224 ..... $49.56

CD-ROM



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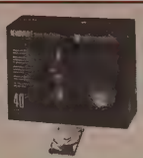

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Western Digital 40MB PCMCIA Drive #84-10009

This drive features a Type III ATA disk drive, less than 16 ms access time and data defense shock detector.

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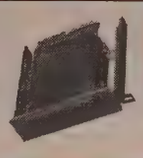
Increase the performance of your Colorado Jumbo Tape Drives. This high-speed controller improves data transfer and storage reliability.



$34.56

MITSUMI

Mitsumi 1.44 MB Floppy Drive #16-10067

This high-quality 3.5" floppy drive makes it easy to upgrade your system. Its quick and simple installation is a snap!

$279.64

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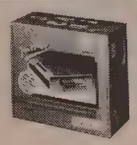

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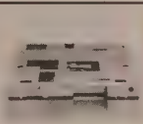

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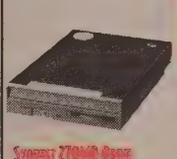

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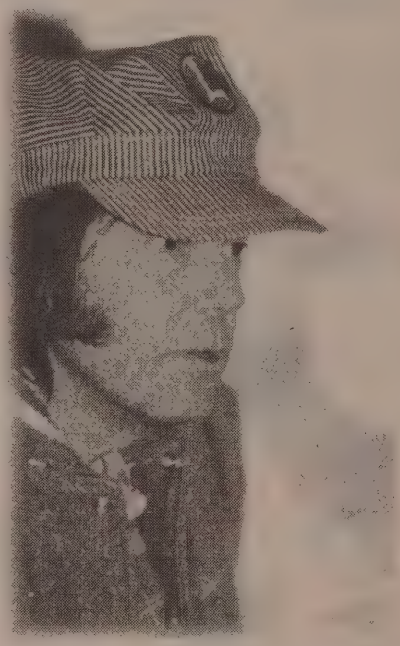
Neil Young arrives for our interview, cruising into the parking lot of the cafe on Skyline at the wheel of a venerable 1950 Plymouth, its engine purring silkily, its chrome sailing-ship hood ornament catching the afternoon sun.

When the Plymouth was in its youth, electric trains, with Lionel at the forefront, were the high-tech toy of the day. Indeed, the computer industry as it now exists had roots in the train hobby; according to Steven Levy in his classic *Hackers: Heroes of the Computer Revolution*, the first people who decided to do something interesting and nonstandard with the primitive computers of the '50s were the wizards of MIT's Tech Model Railroad Club.

For a number of reasons, technology and the toy business passed the train hobby by, and for the last couple of decades it's been largely the province of dedicated but aging enthusiasts. Today, though, Young is here to discuss his plans to change all that. The CAB-1, the first-ever wireless remote control for electric trains, is the first commercial product developed at Liontech, his joint venture with Lionel owner Richard Kughn, and it's about to hit the dealers' shelves. Waiting in the wings are smart trains with onboard microprocessors and digital sound—toy trains with the look, feel, and sound of real ones.



Neil Young's technical interests have long paralleled his musical pursuits. A dedicated tweaker of sound equipment, he began seriously tinkering with electric trains in the course of introducing his son Ben to his own childhood hobby. "He learned how to play with trains when he was about two years old," says Young. "He needed special buttons, because he has disabilities, so he started with buttons and things like that that I would make for him. I really got off on making these buttons, but there was still just the same technology, with a button stuck in the line somewhere to either discontinue it or interrupt the power or turn it back on. I didn't really have much control."

In the course of making his ever-growing train layout (recently featured in a cover story in *Classic Toy Trains*) more accessible to Ben, and later his fellow students at the Bridge School (a Peninsula school, cofounded by Young's wife Pegi and Dr. Marilyn Buzolich, where innovative technology helps kids work around severe physical disabilities), Young developed an ever-growing wish list of what train sets, essentially unchanged since the '50s, should be able to do.

"I had this concept for a long time," he says, "the idea of a controller controlling the whole environment. The lights, the action, the accessories, the switching, the routes that the things go. The speed of the individual trains. The lights on them, all the sounds. Everything."

Fervor, zeal, and persistence of vision kept him going on an R&D project that no sane toy company would even contemplate. And one day in 1992 he paid a visit to Lionel.

"I met them and talked to them. I said, 'I'll build a prototype and bring it in and show it to you, because I don't want to just sell you an idea, I want to show it to you.' Obviously building a prototype for this thing was quite an undertaking because it had to work; you had to prove in some way that you could do this hand-held controller thing with no wires and control the layout. So I made a very primitive version of it, with a development company called RDL here in Menlo Park."

Demo-day came. "I had a huge barn in the middle of the table with a couple trains running on it; the barn was a storage shed/repair shop for trains. It had a big door on it. When I hit a certain button, the door would open; it made this huge rattling sound and crashed when it hit the top. And then the engine came out, pulling the hand-held controller on a flatcar behind it.

"It was really like a Hollywood production, but they went nuts when they saw that. I was just showing them the secret of what I think is the magic of playing with things, which is feedback—when you initiate a command, you have to have feedback."

Young has an infectious excitement about making train sets, the virtual worlds of a bygone era, accessible and inviting to a new generation. And their benefits, he says, go far deeper than mere entertainment.

> I built feedback into the whole system, so if a kid couldn't see, he could hear. When you hit a certain button and the train slows down, the brakes screech, and there's all kinds of things that happen to let you know you've done something.

"You'd be surprised," he says, "how much of an association with healing there is with trains. There's a lot of train sets in hospitals, where kids go and play with the trains. Down at the clinic at Stanford they have a train layout that you can push buttons and watch and play with. In Boston, at another kids' hospital, there's a huge layout that's accessible to all the kids with disabilities; in Chicago there's another group that specializes in building train layouts for disabled people.

"There's a new movie by Spike Lee that's coming out—this guy is a criminal, I don't know what he does, like a murderer or a robber or something. He's bad. But he does these terrible things, and then he goes home and plays with his trains, to forget and to get away from what he is, what he's doing.

"It's a great escape—you can create a world, and then you can control it. People just get lost in it." (Lionel, 313/949-4100; *Classic Toy Trains*, 1-800-533-6644)

How did you get into trains?

When I was a kid I had trains. My dad bought me some, and then in 1977 or '78 I kind of started getting into them again.

I was out shopping for Christmas gifts, and I found an old train in this antique shop. It kind of got me started on what a cool thing they were—a little mechanical thing. Right away I started thinking about what would be cool—"if this could happen, and all of these things that were on it worked..."

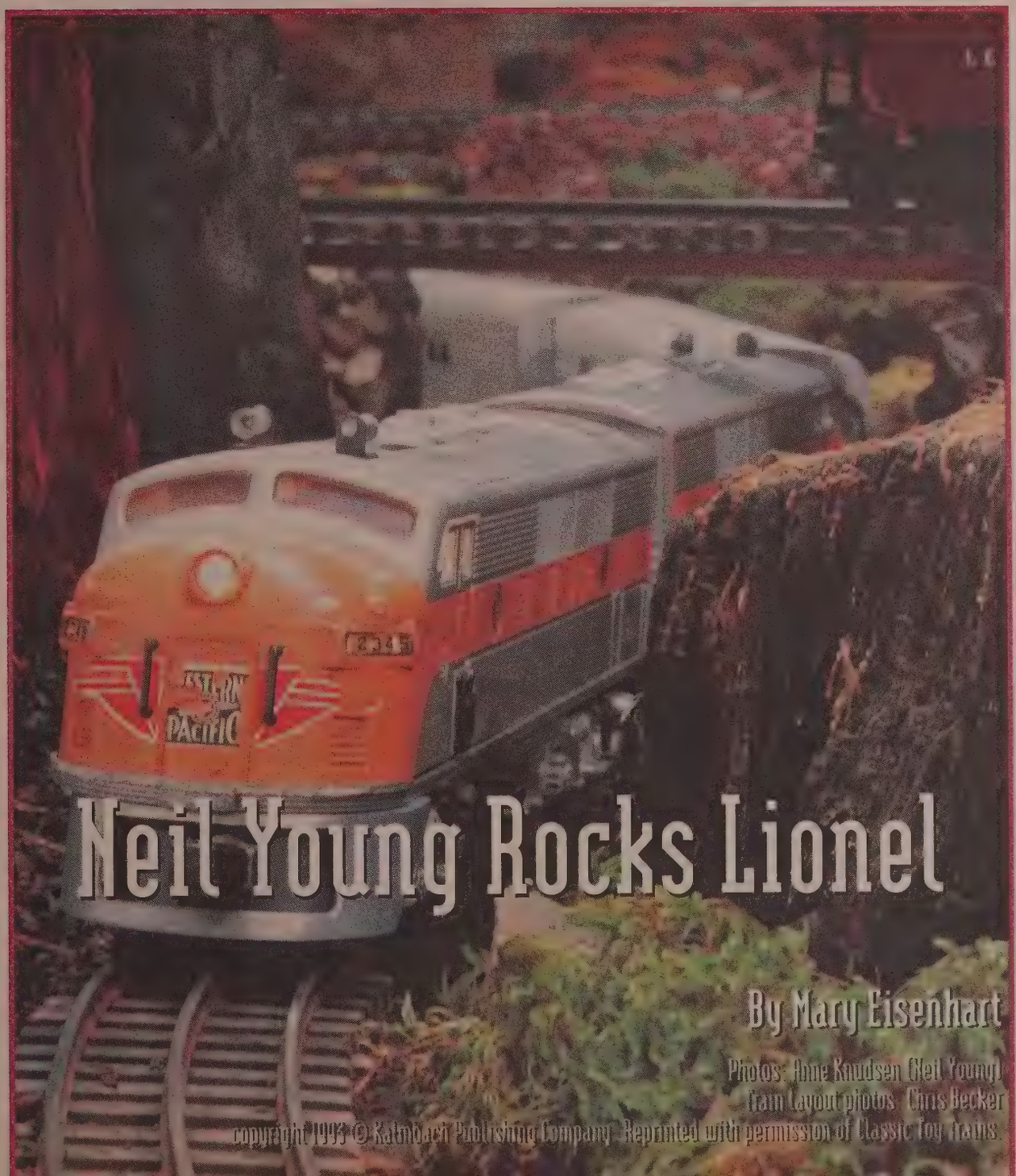
I wanted to develop some kind of a system to control the trains so that they could do everything that you could imagine that they should be able to do.

In the '50s, Lionel as a toy company was really on the cutting edge with technology. Remote control—press a button and this happens—which was pretty good for the '50s.

And then they sort of went into a decline, as I recall—the HO scale got more popular...

The whole hobby kind of slammed into a decline, and then slot-racing cars came along. HO trains came along real big. People were making less money and it was not going as far as it used to. There were smaller places to live...

Electric Trains For The 21st Century



Neil Young Rocks Lionel

By Mary Eisenhart

Photos: Anne Knudsen (Neil Young); Train Layout photos: Chris Becker

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Neil Young *continued*

Digital technology's great for toys, and fantastic for news, incredible for archives, unbelievable for controlling things. But if you really want to get down to the real thing, when you go digital you lose it.

So you couldn't just set up a big old train set...

Yeah, right. It wasn't easy to find a place big enough.

So a lot of things kind of converged to make the hobby kind of obsolete, or make it so you used smaller trains. It became not fashionable—you know, when jets became fashionable, and trains were kind of out?

Trains used to be kind of like the rockets—it was the fastest way to get around, the most modern transportation. At that time, trains were news.

That kind of died, and the whole thing kind of went away, except for some diehards who stuck with it, stayed and collected trains and played with them. Reliving their youth with them, and trying to show their kids the same thing that they enjoyed with their parents. Trying to pass it down from generation to generation.

But the technology was so far behind that the children wouldn't be interested. They're not interested in something where you have to stay in one place to operate it, and everything is like an antique. Kids just don't understand playing with antique toys. They don't understand it. It's not attractive. It's not nearly as stimulating.

So I wanted to develop something that would give it that play value, that newness to it. Some modern type of control system.

I still kept thinking about how cool it would be to make it really work, so over the period of about fifteen years I devised a kind of a blueprint for what I wanted. It really took a long time, because like any engineering thing it's very deep. It's really a lot of detail, more than you would think.

A lot of interdependencies.

Yeah, there's a lot to it. That's why it's so fascinating; that's why I've got all these great engineers working with me, because it is a fascinating thing to do. It's got a lot of depth to it.

The overall goal is to make an advanced toy that brings families together, in a way that video games don't. Video games are a very solitary, secluded, me-against-the-machine kind of thing, and I'm trying to use technology to make a toy that kind of stimulates a family situation. At least a father-and-son situation, maybe a whole-family situation.

You create these scenes—you make scenery, or, depending on your artistic tendencies, you create a situation that the trains live in. Then the technology takes over, and you control the whole thing from these hand-held controllers, like video controllers.

It takes it to a whole new level—you can interact, and there's all kinds of games that you can get into playing, just figuring things out, solving problems, stuff like that. It really makes people work together, which is what I really like about it.

My son and I have spent many happy hours in there, and now the kids at the

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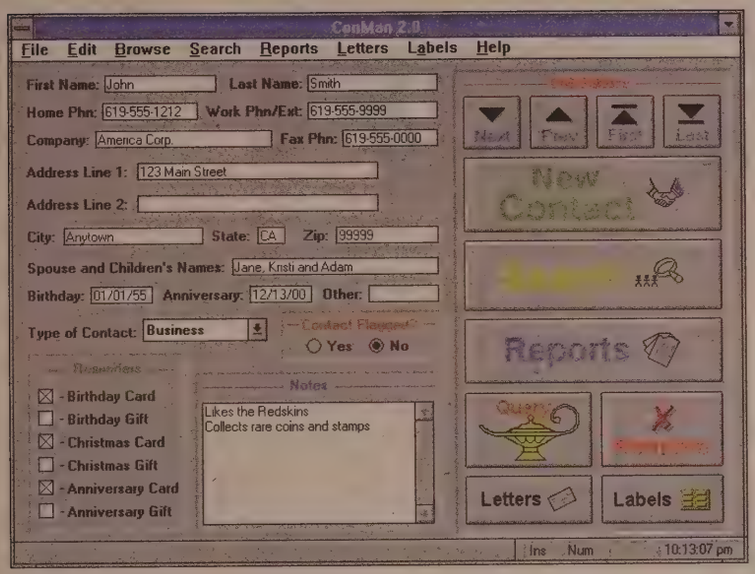

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Bridge School come down and check it out every once in a while. This year we're hoping to have them down two or three times over the school year, just to come down and play with them. Especially the kids just beginning to learn how to use computers to communicate—the cause and effect is so reinforced with this toy.

You push this button and something happens.

Yeah, right. It's designed so that you can change the function of the external switch. Any kind of switch can be accessed into this controller, and whatever you initiate on the controller, the switch will mimic it.

You can change the function of the switch instantaneously, so it fosters interaction between a two- or three-year-old and a parent—you can say, "You want to blow the horn?" and the kid says yes, or you blow the horn once, and after that the kid can blow the horn as many times as he wants. You can constantly change whatever the switch does, instantaneously.

Kinda like a programmable remote?

Yeah, it's like a remote control, and whatever you do on it, the big switch will mimic it. It makes it possible to move around—it's all wireless so you can share the thing with a little kid, or in our case with a disabled person. Lionel is on the cutting edge in this instance—they've made a toy that's accessible. It has an input for people who haven't got fine motor control to choose their input and plug it in, and whatever they do will make things happen.

That's really cool. That's a lot of fun, to be involved in something like that.

I built feedback into the whole system, so if a kid couldn't see, he could hear. When you hit a certain button and the train slows down, the brakes screech, and there's all kinds of things that happen to let you know you've done something. If you can't see it, you can hear it. In some cases I've married the two things, so you hear and see them in synchrony, which is really magic—you've got real control of the event.

So where do you get these sounds from?

We get them from the real trains. We go out and record them digitally with an 8-track DAT, then we bring them back to the lab and break them down into samples. We push it into a chip—we've got a program that spits out information based on the speed and condition of the train and the input from the user.

The controller in your hand talks to a chip inside the engine?

Yeah.

It's a whole modular system and you keep adding stuff on?

Completely. Yeah. In its most evolved state, it has a very big sound ROM and two microcontrollers and two separate boards. The boards ride on the locomotive—one of them is for controlling, and one of them is for making sounds.

The sound comes physically from the train. We use the train and the car itself as a speaker enclosure, and try to acoustically design the inside. In cooperation with Lionel, we work on the acoustics.

We really work on these things together from the beginning, really work on getting the speaker in the right place, fastened correctly and all of the air blocked off—all of the physics that goes into making good acoustic sound. So it sounds a lot bigger than you would think it would!

What parts of the system are going to be available this Christmas?

This Christmas the first level of the system is available, which will control trains much the same way as they were controlled for the last ninety years, except it's a remote control—you can walk around with the controller, control the direction, blow the horn, and ring the bell. Speed it up and slow it down; select different trains on different tracks instantaneously and run them too—that's something they've never been able to do before.

And then it has some accelerated features that enable just better control of

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the direction, because you're dealing with some very old technology.

Basically with the old technology you could control the speed of a single train by giving it more or less power?

That's right. That's the old technology.

The direction was controlled by this drum that spun around. Every time you interrupted the direction, a little spring would pull the drum into a new position, and two new contacts would reverse the polarity of the motor, and then it would go the other way. This was like a mechanical device, really primitive.

But we managed to create a power control and regulation on the track that really got a hold of this thing. It takes the Lionel three-rail track—it controls any Lionel train ever made, right up until today.

So you can have your turn-of-the-century train set work with this?

Oh yeah! It works great! It makes them work better than they ever have before; you can get more out of them.

The control is very fine; plus you have the accessibility, where you can move around. You're not limited to being in one place watching, and having to go over and look at it as it goes by, but not being able to stop it without going back to the control panel.

It minimizes a lot of wiring; there's a lot more you can do.

Now when we show it at trade shows, the kids grab it and they won't let go of it. And that's rewarding, because this hobby has been at a point where it's been going downhill because only a bunch of old guys are doing it. I'm like a young guy compared to most of them. They love it, but the future of the hobby has got to be the kids.

It's such a cool thing, because it brings families together. At the core of this thing is goodness. That's what I really like about the whole idea, the fact that by creating this thing I might be able to be responsible for something that enables families to come together more in some way. It's really cool. That's the good part that I always refer to when I'm slamming myself trying to figure out how to make something work.

What is it about trains that brings people together in a way that gathering around the Nintendo does not?

Well, with the Nintendo you're playing against yourself, or an imagined enemy that's represented by the machine. There's only you and the other party; maybe you've got somebody beside you who's also playing against himself or an imagined

The Liontech Skunkworks

By Bruce Koball

Realizing Neil Young's ideas for controlling a model train layout posed some challenging design problems: How do you create a system that's easy to use, and yet complex enough to provide the variety, interaction, and realism that hold a user's interest? And then there's the "phone company" question: How do you design a system with new, high-tech capabilities and still maintain compatibility with an installed base of existing products that may be decades old?

To solve these problems, Neil and Richard Kughn, chairman and CEO of Lionel Trains, formed a development company called Liontech. Working for Liontech, under Neil's direction, Rick Davis at Real Design Labs in Menlo Park, CA, developed prototypes of some of Neil's initial concepts. Neil then engaged expert toy designer Ron Milner and the engineers at Applied Design Labs in Grass Valley, CA, to create the finished product, Lionel's new TrainMaster® microprocessor-based control system. The initial components of this system are the CAB-1, a wireless, hand-held controller, and the PowerMaster, a power control unit that receives commands from the CAB-1 and applies power to the track.

Traditionally, Lionel's model trains were powered by large and heavy devices like their classic ZW transformer. The ZW controlled the train's speed by varying the AC voltage to the track and the train's direction by momentarily interrupting the track voltage. (In older trains the track voltage interruptions actually cycled a rotary relay in the engine through a forward-neutral-reverse-neutral sequence.) To trigger horn and bell sounds in the train, the controller superimposed a small positive or negative DC offset on the AC track voltage.

The heavy transformer is often replaced in modern systems with solid-state circuits, but the necessity of remaining close to the controller still limits the mobility of the user. The TrainMaster system, however, removes this constraint entirely and allows the user tetherless control of all aspects of layout operation. Conventional systems also require multiple controllers and complex wiring for simultaneous operation of more than one engine on a layout; TrainMaster removes this constraint as well.

Currently, when running in "conventional mode," the TrainMaster system uses the traditional AC voltage/DC offset control scheme to provide compatibility with existing trains and layouts, while enhancing their operation with features like variable "momentum" and the ability to control up to ten engines on separate tracks with a single CAB-1.

In the near future, the addition of a third component called the Command Control Base, along with suitably equipped trains, will allow a TrainMaster system to operate in "command-control mode," giving the user control of many more functions, including lights, couplers, sound effects, track switches, and other layout accessories. Command-control mode will also allow multiple engines on the same track to be controlled individually, dramatically simplifying layout wiring. The combination of these features provides an almost limitless variety of play options.

Liontech's development efforts have also been directed towards a goal of particular interest to Neil, the creation of realistic sound effects for Lionel's model trains. Again working under Neil's direction, Liontech engineering consultants, including Rick Davis, Joe Thibodeau, Rudy Trubitt, Ron Milner, and Bruce Koball, have created Railsounds II, a microprocessor-based, six-voice digital sound system that fits inside Lionel's model trains.

Individual sounds from real diesel and steam engines are captured by Neil and his engineers, as Rudy describes in the following sidebar, and stored digitally as separate sound records in a ROM chip, using a delta modulation scheme. During operation, the Railsounds II microcontroller retrieves the individual sound records, mixes them together and plays them back simultaneously at a 11.025kHz sample rate with 12-bit resolution. The playback of these sounds is controlled by a complex combination of stimuli, including the current speed of the train, its recent operational history, and direct commands from the user.

Much attention has been paid to optimizing the acoustics of Railsounds II-equipped engines, as well. Neil and Liontech acoustical consultant Dennis Fowler work closely with Lionel to produce the best sound possible for each different model. The result is a remarkably high-quality sound reproduction system with a very large repertoire of sounds that are unique to each engine model. ■

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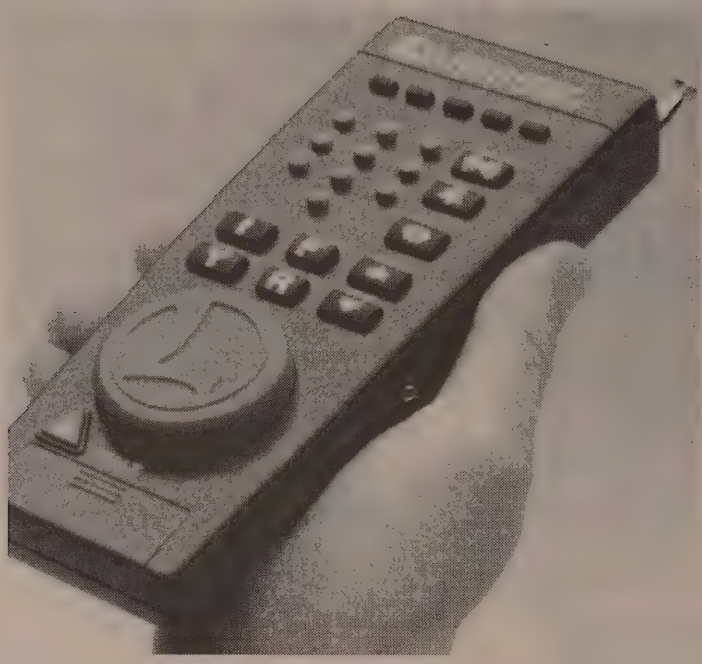

The CAB-1® remote controller allows you to operate your trains from anywhere in the room as well as control sounds, directions, boost and brake.

enemy. It's very rarely that you have two people playing against each other; they're really playing against the machine and what the machine is doing.

It is similar, inasmuch as you get lost and you stay there for hours. But you can't reach in. If you break something in the machine, you can't fix it. There's no third dimension to it—it's all in your mind.

With the Lionel thing, if you break something you can take it up. You've got physics. You've got electronics. You've got all these other things in reality, working on something, actually having to get a part and fix it and do all of these things.

A lot of fathers and sons can share that experience and really get a lot out of it.

Even mothers and daughters, *Neil!*

Yeah, I know they can.

[*laughs*] I guess you're right. Daughters and fathers!

It is true, there's a lot of girls that are into it.

Gotta make this a nonsexist story.

That's right! This is a nonsexist story.

Lionel even made a girl's train at one point.

I remember. It was powder pink or something. No self-respecting girl would have one.

Right. Now it's a great collector's item because nobody bought it in the first place.

If a girl's going to like trains, she's going to like *real* trains. It doesn't have to be like a baby or a doll or something. They really missed the point on that one. She's going to want it just like the guy does—good paint job. A lot of lights...

So is this a big boon to Lionel's business, considering the state of the hobby?

The idea of having this new control system is revolutionary to the hobby in general. A company as big as Lionel is actually producing this thing and making it, and it's a whole integrated system that's really designed to be user-friendly and real easy to use. It's designed for a lot of feedback, and a design to grow in the future, so it'll just keep changing and evolving.

It's got a port on it for a PC, so you can control the trains from a computer. You can make maps—they have a program called CAD Rail where you can make up a map. They have interfaces for signals, so you can apply your signals to certain parts of the map and start off with #1 positions on all the trains, and sit and watch on screens as the trains move around, just like in the real control yards—computerized control. You can take it as far as you want to go with it. It's really quite interesting

Where do you think it will go from here?

I think it'll just end up becoming what it was in the first place, something where the parents can see, "Well, if I get this thing, it's going to be fun for me. And it's going to be fun because the kids are going to like it."

We know the kids like it, because as soon as you put the controller in their hands, they're gone—they're running around the table chasing the train, and then they don't want to give it up. They just become mesmerized by it.

It's designed so everybody can have a controller, there's not just one. You can run as many as you want at the same time.

How to you keep them from interfering with each other–are they on different frequencies?

No, it's all on the same frequency, but we've designed them so they stay out of each other's way. They all talk at the same time. It's real quick, so there's no stepping on you. Two people can run the same train at the same time. Games can happen—you can do things to the other guy's train to mess him up, uncouple his cars from him by remote control...

I don't know how many millions of Lionel train sets are out there—there's got to be somewhere between five and ten million units out on the streets now, that could all be retrofitted with this technology. And even if you don't retrofit, they'll still work better than they ever did before. You can really do a lot more with them.

You still get the ozone smell, though, right?

Oh yeah, the ozone smell! What made you ask about that? That's a very inside kind of question....

The ozone smell with Lionel, that's one of the joys. And with the hand-held controller you can get right down next to it as it goes by and get a good whiff! [*laughter*] The real thing!

Do you see this expanding into other toys? The principle can clearly be extended beyond trains.

We have the technology to do that with any kind of toy. A semitrailer, a steam shovel, anything. The principle of controlling toys in a way that they've never been controlled before, inasmuch as everything on it will work—it's almost like a real thing. If you had a dump truck, you could completely work, by remote control, everything on it. Plus it would have the sounds and everything.

Trains are fun because you get a whole bunch on the same track, but these other vehicles and airplanes—nobody's ever really made an airplane with a sound system. A jet that sounds like a jet, or a propeller plane that sounds like an old prop plane when it starts up—it wheezes, and does all that stuff, and then it rattles and then it gets that whine happening....

You can do all that, and really make them sound exactly like they sound. Design the thing so it'll resonate...

I'm told you guys put a lot of effort into tweaking the sounds so they were just exactly right.

Yeah—first of all, the recording of the sound is done right; we do it very

continued on page 91

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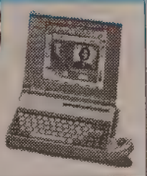

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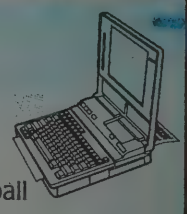

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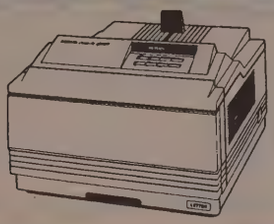

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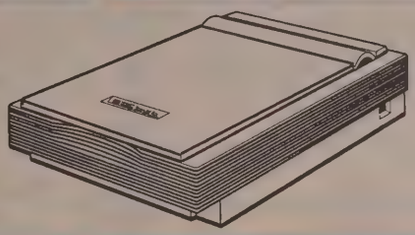

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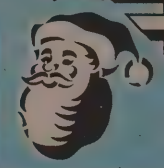

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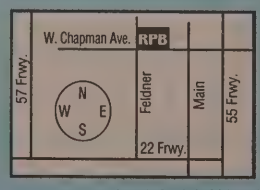

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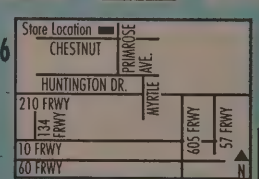

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continued from page 86

cleanly and get a good solid recording to start with, which is the most important thing.

Then we make sure the speaker enclosure is physically correct, so that it's living within the laws of acoustics, not trying to do something just because you're hoping it's going to work, but putting the speaker in the right place, making sure that it's fastened correctly, making sure that it's in a good place in space and that there's a lot of volume around it. That it's not cluttered up with other things so it can start a resonation going. And then basically tuning it in a little bit so it does resonate the best it can, and getting the most efficiency out of it.

You edit the sounds on computers?

We edit all the sounds.

There's a sound we have now, a steam engine that we just recorded from the Norfolk and Southern railway, that's coming out on Lionel in about three months. There's over fifty different sounds that it makes—we have fifty different samples that it will play back, according to the microprocessor that's on board. We programmed it to take into consideration the speed, the exact synchrony of the smoke unit which is puffing out the smoke. It has to know when it stops, exactly. It has to keep track of all these conditions, keep track of the sync of the speed with the cam, then the voltage on the track.

You take all of those and combine them with digital inputs at 3000 baud coming at it through the rails, and you can control the effect.

That's at the upper end of the system. That's when you start using all of these things and add digital signals over the track in addition to the onboard monitor.

So you could go completely crazy with this.

Yeah. I have. [*laughs*]

Liontech is a joint venture of you and Lionel?

It's a joint venture of myself and Richard Kughn as individuals, not really Lionel. Richard Kughn owns Lionel. He has a huge car collection, he has a train collection, he's a very successful businessman, he's done a lot of things in his area. He used to be a magician when he was young; that's one of the things he did at the beginning of his life. He has a huge pipe organ; he collects all kinds of weird things. He's got a bicycle collection.

So we have a lot in common. I like to collect things too, so we got along real well. I guess what happened with Lionel is that he collected the trains for a long time, and then the company came up for sale so he just bought the company.

And then he's brought it back.

When did he buy it?

He bought it about eight years ago, I think. Since then the quality of the workmanship and the control of the quality and the products have consistently gotten better. We make our electronics overseas, but a lot of our stuff is made right in the US, and the things are put together here.

To do that, working within that framework, and really pack quality into it, is a big job. He's come a long way.

Yeah—before I fell into this way of life I ran toy departments for a while during the late '70s and early '80s, and Lionel was pretty dead in the water.

Only the spirit was left. People would come in trying to buy Lionel, because they remembered what Lionel used to be. They didn't even know if the company was still in business. They'd buy something, and they'd be disappointed, because it wasn't as heavy, and didn't work right.

But now, they've just modernized the approach, through reorganization, restructuring, modernizing the entire facility. More important, now they're using the team method as opposed to the old hierarchical structure of industrial companies. They've changed it into teams, and they're having a lot of success with that. Yet they're still in the same factory in Detroit that they've been in for the last eight or nine or ten years.

He's really brought the quality up, and now the technology is back where it was in the '50s, when they were the leading technology in toys. They're now the leading technology in toys. There's nothing like it anywhere.

I say that really believing it. We have other companies coming over to us wanting to use our technology all the time now, competing companies, saying, "We can't do this development, but you guys did." We're both so into it, Mr. Kughn and I both are so into it, that the development was a real great thing. We just kept going until we had it.

That hacker zeal...

Yeah. We got into it.

Are you going to license it to other people, or is that one of those business decisions you're not involved with?

Well, that's still...it's a business decision, yeah.

It's quite advanced compared to everything else out there.

What would you like it to be able to do that it can't yet?

I would like to see the virtual cab.

Recording Rail Sounds: The Inside Story

By David (Rudy) Trubitt

Recording locomotives is definitely a "don't try this at home" proposition. Capturing the raw sounds for individual Lionel locomotives has taken us across the US in search of authentic engines and their accommodating crews.

While there are many historical and contemporary train recordings, these are typically the sound of passing trains, a blur of overlapping sounds, Doppler-shift, and ambient noise. A dramatic sound, to be sure, but we need more detailed samples of the individual elements of a locomotive's sound.

Using portable DAT recorders and a variety of professional microphones from Neil's studio, each engine is put through its paces while mics pick up the action from every conceivable vantage point.

Back at the ranch, these recordings are transferred digitally into a Macintosh running a Digidesign Sound Tools II system. Using sound editing software from a variety of sources, individual sounds are edited, sample-rate and word-size converted.

The final release of each set of engine sounds is a little like finishing an album—after all the basic parts have been performed and recorded, the last step is balancing levels, listening to the blend, and balancing some more. Neil's ears are the final judge, a dB here, half a dB there, and another sound ROM goes out the door.

We go for three things in every set of engine sounds: playability, listenabilty, and authenticity. Some sounds, like steam whistles, horns and bells, are actually played by the user. Others happen "in the background." Motor noise, chuffs, compressed air "let-offs," and other sounds react indirectly to the operator's commands, simulating the sound of a real locomotive.

For instance, blowing a horn depletes a real engine's store of compressed air. When pressure falls, an air compressor speeds up to replenish this reservoir. Railsounds II's software mimics these inter-dependent sounds, recreating the complex sonic signature of a live locomotive. ■

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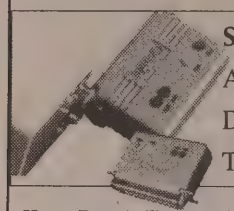

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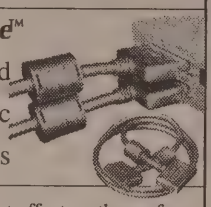

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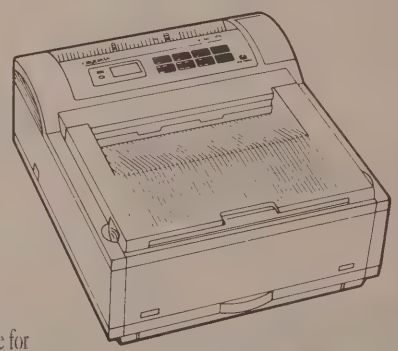

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Neil Young *continued*

So you can be in the train as it goes around.

Yeah, and you can watch your own trackwork, feel yourself going over the tracks you laid, and see the signals and respond to them. Reach out with your glove and change the controls on the cab. Look out the window all the way around and see a stereo picture while you're moving on the track.

I think that's possible before the year 2000. It's possible now, but possible and affordable is what I'm talking about.

There's a lot of things happening in the virtual field. All that work's being done for us right now. By the time it gets to the stage where we can use it, it'll hopefully be cheap enough to interface it with a little digital stereo camera and mount that in the headlight of the train. Or in a couple of other lights, one on either side. And have your virtual cab.

Then the inside would look just like the train you were in—you could get a package of cabs, so you were inside locomotives, and adjust what type they were, and what road name they were, and everything. The paint would change. Some of them would be old, and some of them would be new—you could get into that.

How would you do this—would you get a separate software package and have the camera feed to your computer screen, or what?

I don't know—I'm sure there would be a computer involved in the interface somewhere.

There's some speculation that computers will essentially disappear in favor of single-purpose devices that have far more compute power than our desktop machines today, but we won't think of them as computers, we'll think of them as toasters, or VCRs or something. Do you see that happening with trains?

You mean like computers you wear? Where it's no longer in the state that it's in now?

Like computers doing everything, but not necessarily saying, "I'm a computer."

Well, we're kind of started along that way now with what we've got going, but at the smallest, most basic level. We've got the microchips onboard—everything happens onboard, and you just control it. The effects happen there, and they're all controlled from there, and the trains are all really smart. They know what you've told them, and they don't forget it.

I don't know, really, how we could do the virtual cab.

Cross the bridge when you come to it.

Yeah. There's other guys.

There's just the fact that I want to do it, and I know what I want it to look like. I know that the effect would be awesome. You could build an environment that would look good from the track, and building it in itself could take years. But then you could put on your glasses and ride down the track while controlling the vehicle, and look out the windows.

To me, that would be awesome.

At Silicon Graphics they have simulators that do some of this now. But again, you need megabucks. You don't just go down to Wal-Mart and buy one for Christmas.

No, and it's not real-time live either. They're sitting in one area, right, and they're simulating your ride, where you're going?

The difference with this is, this is real-time. You are riding. You're looking

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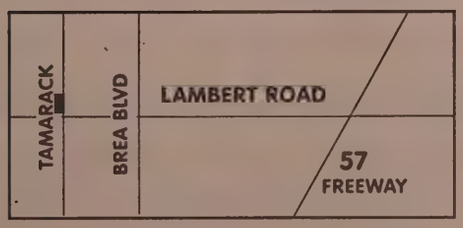

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through the window and the thing's going down the tracks. It's not going down some tracks that have been programmed in there; you're going down the tracks, and it's a live picture.

Well, in one of their simulations, you can drive on the road, but you can also fly.

Oh wow...

You can move the controller and go in any direction you want. You can get the view from Neptune, or the view from the street corner.

But the difference between that and what I'm saying is that if you had a model airplane, and you had cameras in the model airplane and you put on your glasses, you'd be sitting in the model airplane. Then when you took off, you would be seeing what the model airplane was seeing.

So it wouldn't be a canned thing.

No, not at all. It would be real-time.

You would have created the situation that you'd be looking at—the tracks that you rode on would have been laid by you. And you would feel what it's like to go over them.

That's what I want to do with it. We're headed that way, we're just at the bottom. But there's a long way to go with it that's a lot of fun.

And then when you break it, you take off your glasses, you reach in, you get it and fix it.

"That tree is broken..."

Right. "I knocked down the barn."

Advanced toys. Bringing people together in different ways. It's kind of like an innocent endeavor. There's something really good about it that I like, and it gives me a lot of relief.

A change of mode from the rock 'n' roll thing.

Yeah. It's a distraction.

Changing the subject completely, I was really interested in what you were saying at a conference last spring about the need to design better wheelchairs for the kids at the Bridge School. I know they use a lot of technology at the school, and I was wondering if you wanted to talk about it.

That's a very interesting subject to me.

First of all, I'd like to see a chair that knows where a child or where the person that's in the chair should be, what the optimum positioning is for that person, and constantly readjusts and pushes him into that position. If he slumps, it slowly just pushes him back and adjusts, so that he's back into a correct physical position, so the insides of the body can work correctly, instead of being deformed by being pushed one way.

If you have a disability, quite often you have what's called an extension, where the muscles come like this [stretches arms and legs out and goes rigid]. You extend—everything is full-on, like pretending you're lifting a weight, being as strong as you can. But it's an uncontrollable reflex, excitement brings it on. Feet go flying out and everything.

But slowly the chair takes you back, and puts you back, and relaxes you. Puts you back in the position. So the chair is your friend, constantly trying to adjust you and put you in your optimum positioning so you can work your device, be in the right physical space to work your device with whatever inputs you use.

There's all of these different ways for them to access the computer control, and they're all dependent on good positioning.

continued on page 98

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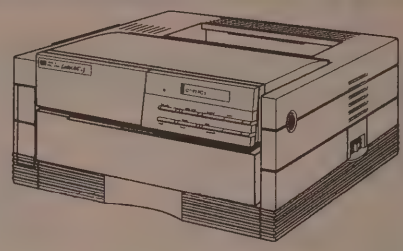

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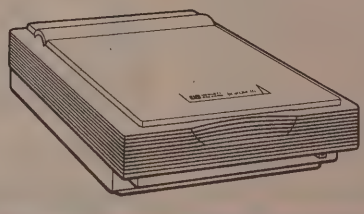

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Neil Young continued from page 95

When you have a physical being that's not in control except for a certain part of the body, and the rest is like randomly going off—so far all we've come up with is restraints, where you try to get them in the right position and then tie them in. It's like you're in the ejection seat in an airplane. You're in. You can't move.

But that's not good, because a lot of people with this extension are very strong. You could break your leg—if you push hard enough, things start to go. And you can't control it.

So the chair's got to give, and it's got to come back. That affords movement, which is healthy. If you're restrained all the time, it's not good for you.

You said that one of the issues is that the kids in the school use computers to learn and communicate, and that sometimes a kid is working with the computer and gets some positive result, causing him to become so excited that he gets out of position. It takes twenty minutes to get back into the right position again, by which time the benefit of the interactivity with the computer is pretty much lost.

That's exactly it. You want to be able to work with those things, have the chair know the optimum positioning. It has to have a lot of inputs and a lot of ways of adjusting, but there's got to be a modular way to build this stuff. There's got to be a way that everything is sensitive, things push, just find that right positioning. Know weight pressures and calculate...

People are all the same basic shape. When you're trying to make a chair for people where you're going to hold somebody in the right position, that means you physically have to make the chair custom-made for that person. But if you have the computer chair or a smart chair that, once it knows, keeps trying to do this, then that'll work for everybody.

Like adjustable hospital beds, though you'd need to be a lot less clunky.

They're not as quick as this. This has got to be real precise, because you don't want it to do any damage. You don't want it to hurt. There's always a risk that the chair could go awry, so there's a lot of things that have to be taken into consideration.

And then chairs that can move around. That's the easy part, I think, the robotic aspects of it. Chairs that know where you want to go, and take you to your destination. Chairs that know their way around the house. Chairs that know what room you're in. And if something is changed, it knows to go around it, even though it wasn't there the last time. Sensors. Ways of turning it off if it gets in trouble. Ways of reacting to different things.

From what I've read, they're doing some pretty interesting stuff with computers at the Bridge School.

Yeah. They have this software that they've developed, and they've developed ways of using programs that have been made by other people, and have developed manuals and published works on recommended ways of teaching kids how to learn using auditory scanning devices or visual scanning devices. That's what the Bridge is doing. I'm not in a position to talk, really, about what they do, because I might not do it justice.

From the computer aspect of it, just from that side of it alone, it's really fascinating. The challenge is great, and the limitations are many. There's so many things.

One of my pet peeves about computerized education in the public schools is that all the kids use

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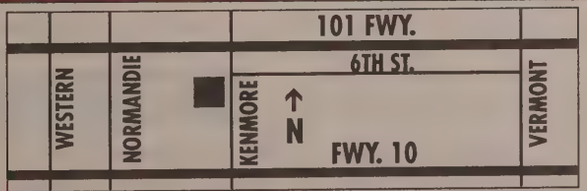

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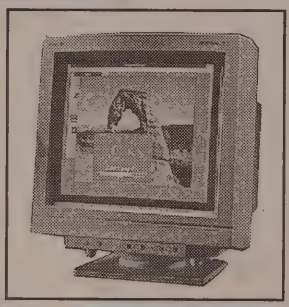

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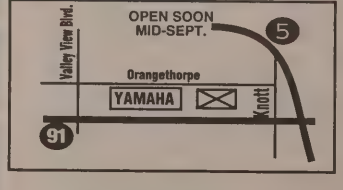

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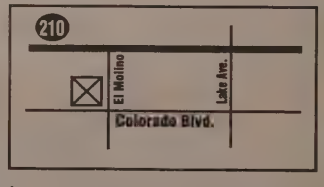

different systems. It really would be nice if there was one device that could handle all of these, but there isn't. Then you would have like a universal tool that could be used as a school tool. All the teachers would only have to know how to operate one machine, rather than every child's different machine. "This is a SPARC computer—what do I do with this?" Or a Commodore, or a Mac, or an IBM. Here it is, this kid knows how to use it, and it's broken. And I don't know what to do with it. And here's the kid at school, and two-three-four hours are going by ...

That's not happening at the Bridge anymore, but that was one of the things that was happening in the public school section that my son Ben was in. There were just a lot of technical things to overcome.

So I wanted, and still would like, to see some sort of a meeting point for all of these technologies, that made them easy to understand for the teachers. So the teachers didn't have to be repair persons. As time goes by, this is going to catch on more and more, and it's going to become more and more of a problem—different systems, different users.

How do you help a kid who can only communicate with the system, but can't possibly fix it? It goes down, and what do you do? Does the teacher have to know every system, or should this teacher just know one system? I think the teacher should focus on learning one system very well, and all the students should use that system, and all the interfaces, no matter what they are—be it light-talkers or touch-talkers or aud scan or any kind of switch array input—should all go through the same type of thing and come out the other end onto the screen.

Standards.

Yeah. Standards should be set. And then the education could really take a leap. But you get into the bureaucracy of all that, that's a heck of a challenge. It's a real challenge.

Technology is going to be there to do some miraculous things, and it's going to happen at just about the time when the baby boomers enter the age when we're all having strokes and becoming incapacitated. Medicine will have advanced to a point where people don't die very early, no matter what happens to them, if they want to stay alive. Things are going to be extended that way. This whole huge generation is going to come upon that time of life, and the technology's going to be there. CEOs, people that are running things, are going to want to keep going. And all that stuff's going to be there.

That's the whole idea, that all of that's just starting, really. It's pretty amazing.

People are pretty familiar with the fact that you're in the music world and less familiar with the fact that you're a technical person as well. Have you just been leading parallel lives all this time?

I've always had technical interests. I'm into modern control of antiques, for some reason. I like the technology from the '50s and '60s.

I like the warmth of the analog sound. I'm a firm believer that the signal should stay analog as long as it can, and that it should be controlled without splitting it.

What does that mean, practically speaking?

Well, if you take a signal that goes along a wire and it gets to a place where you want to make it louder or softer, that's already there in the amplifier and in the guitar. But if you introduce another place, then you have to split the signal—if you have a foot pedal or something like that for volume control, you have to split the signal to do that.

As soon as you go through the device you've lost something. Every time you cut the wire and make it smaller and go in two different directions with the signal, you have split it in half. Only half of it gets through, best case.

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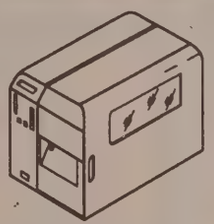

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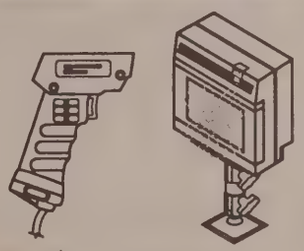

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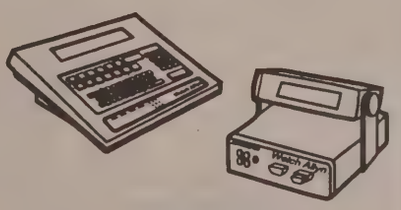

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Neil Young *continued*

I like to eliminate that problem by using the old technology—I like the way it sounds—and controlling it with mechanical interfaces which actually turn the knobs on the original. So there is no split signal, yet you have digital potentiometers making adjustments. They all have presets that you can access.

You're doing all this thing outside of the sound. You're controlling the original controls. It's like robotics. You're playing the original instrument using the original knobs; you're not going through a whole network of sound manipulation to give it all these effects, where actually you're just losing your sound, and it's reconstituting it to make it sound like something else.

I like to keep as much of the original as possible.

So it's a logical extension from that to trains.

Yeah, right. It is. It's the same kind of thing—remote control of potentiometers and different effects.

I have a line of old effects I bought over the years, mostly from the '60s, old effects boxes. They have platinum switches that go to them. Each one of the switches is worth something like two hundred bucks, just for the metal on one side, then there's the other side; when they come together, that's the best contact I can get.

I have a line of four or five of those, and I can take that route. Or I can go straight through, put a platinum connection on either end and bypass that. If I'm not using them, I bypass them completely. But I still have to go through that platinum switch. I can just hear the difference. It's almost nothing, but I can still hear it.

If none of that stuff was there, it would be really pure, but...

What are the limitations, to your ear, of digital versus analog sound?

Digital's great for toys, and fantastic for news, incredible for archives, unbelievable for controlling things. But if you really want to get down to the real thing, when you go digital you lose it. Even though you're controlling it, you're really controlling a reproduction of it, a reconstitution.

> Video games are a very solitary, secluded, me-against-the-machine kind of thing, and I'm trying to use technology to make a toy that kind of stimulates a family situation.

It can't pick up everything.

Well, it picks everything up, but it averages it.

The way I like to explain it is (pointing through screen on window to my car in the parking lot)—see this screen here? We're looking through the screen. You're looking at the car out there, it's a little Hyundai or Honda or something. In the digital world, every one of these little squares in the screen is averaged to the dominant color. It is what it is.

In the analog world, and in the real world—suppose you were looking at the clouds. Every one of these little squares has a universe of possibilities in it that you are really sensing. Your body can sense these little things. They're like input for you. They make you feel good.

That's why the world is such a great place—you walk outside and you look at the sky and it's beautiful. But if all of a sudden you were robbed of ever being able to see that again, and all you saw was digital—if you became like a robot, no more eyes, you'd miss it. It would be like a feeling. You'd feel it. You wouldn't feel this cleansing you get from your mind looking at all its infinite possibilities.

It would be like being in a hermetically sealed air-conditioned building versus breathing real air.

Yeah, right. You get the real input, and the joy of having to balance out all of these factors. It's like a massage for your senses. Music is supposed to be that. So digital music is like a catastrophe—you don't have it. It's just not there.

The standard now is 16 bits. I've sampled my old masters at 24, which is like years ahead, and then I can break it down into 16, where we are now. In the future, when Super CDs, and Super-Super CDs or whatever's next after that come along, 24-bit may be realistic for that. The amount of more detail you get with 24 as opposed to 16 is quite a lot.

The idea of not having it all is really hard for me to take. Even getting as much as 256 times more, or whatever it is when you go to 24—I don't know the math, but I know it's some astronomical amount—every one of these squares would have 256 squares in it.

That kind of detail's approaching what should be happening. But for music, which is supposed to have a cleansing or [*grins*] polluting effect on you, whatever, it can't do it. It's limited by its digital nature. It's a sensual thing, completely. ■

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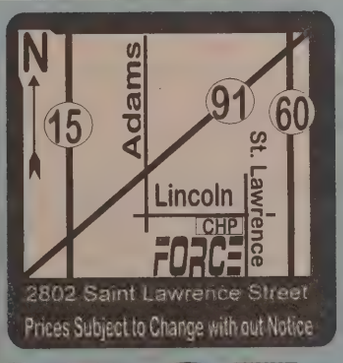

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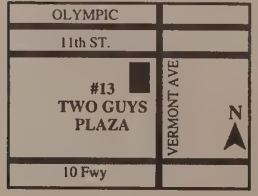

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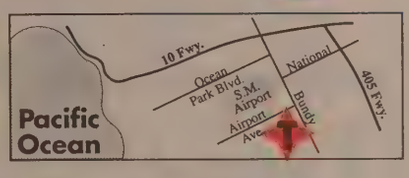

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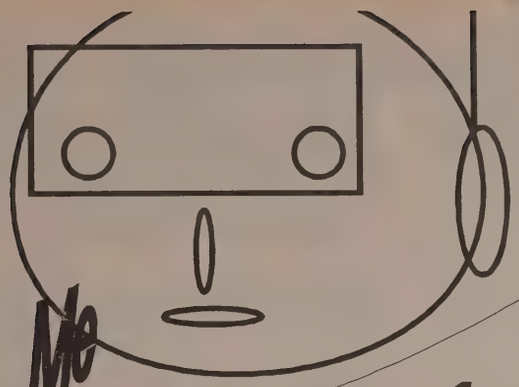

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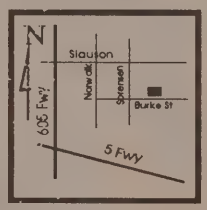

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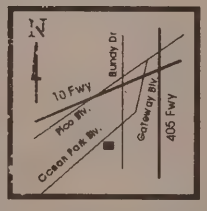

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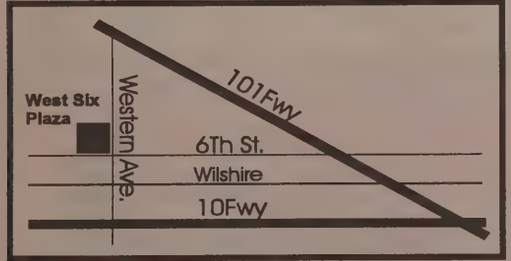

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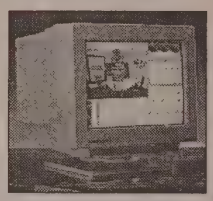

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T660i	20"	.28	1280 X 1024	1999
F760iW	21"	.31	1280 X 1024	1899
F780iW	21"	.26	1600 X 1280	3199
T220	20"	.30	1600 X 1200	1999

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Holiday Shareware Roundup

continued from page 38

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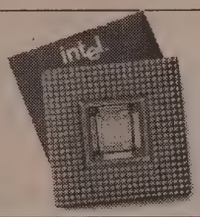

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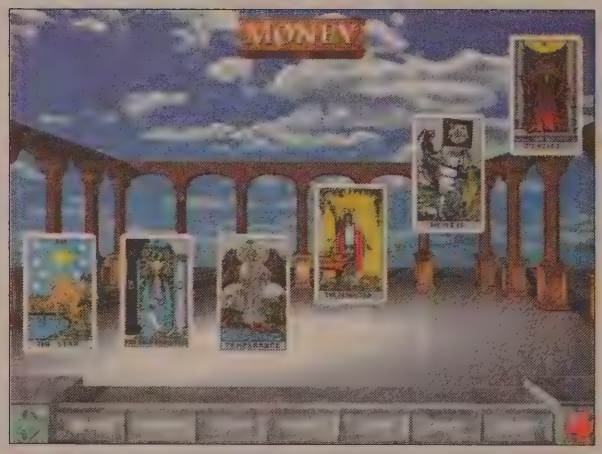

Finding the right multimedia gift could be a tricky task. There's a lot of junk out there, a lot of so-so stuff that doesn't really engage but might appeal to specific interests, and only a little that's really successful as multimedia. There was supposed to be a flood of titles before Christmas, but as of late October, very few of them have actually appeared.

What follows are the better titles that I have seen relatively recently. Not all are brand new, but they are all good examples of what multimedia can be.

BAR-MIN-SHI CONSUMER PRODUCT

It's pretty ironic to recommend this CD-ROM for the ultimate consumer orgy, since it's a malcontent's pointed and withering look at advertising and its role in consumer culture—but that's exactly what I'm going to do, and highly too.

Bill Barminski comes from the Texas punk and art scene; in a QuickTime segment he speaks movingly of a Damned album his brother brought back from London because it was so different and interesting. Now he's made an equivalent thing with this CD-ROM, which is essentially a collection of his paintings and comics from over the years, along with his strange little songs, QuickTime interviews with him, and an utterly hilarious game.

To enjoy all this, you'll have to be able to deal with statements like "They've brainwashed people to think democracy equates with capitalism; capitalism should be something to serve democracy, not the other way around." But if that's okay, this CD-ROM is one of the best examples of how this new medium can be used to express a personal point of view.

It also looks great and made me laugh more than any other CD-ROM that I recall. If no one else gives you this, get it for yourself. (Consumer Productions, 3700 Inglewood Blvd., #8, Los Angeles, CA 90066; 310/391-5897: $49.95, Mac and Windows)

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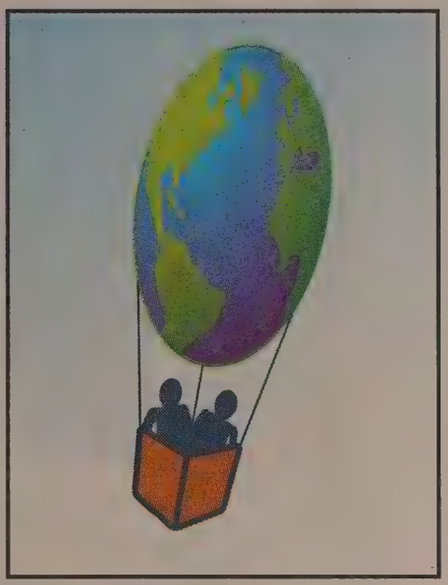

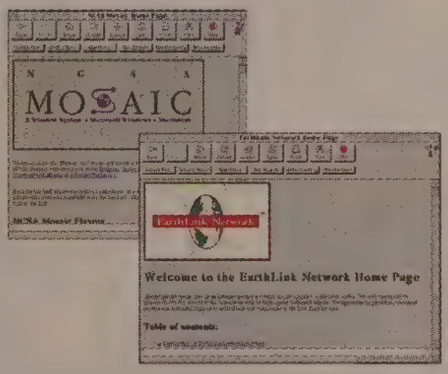

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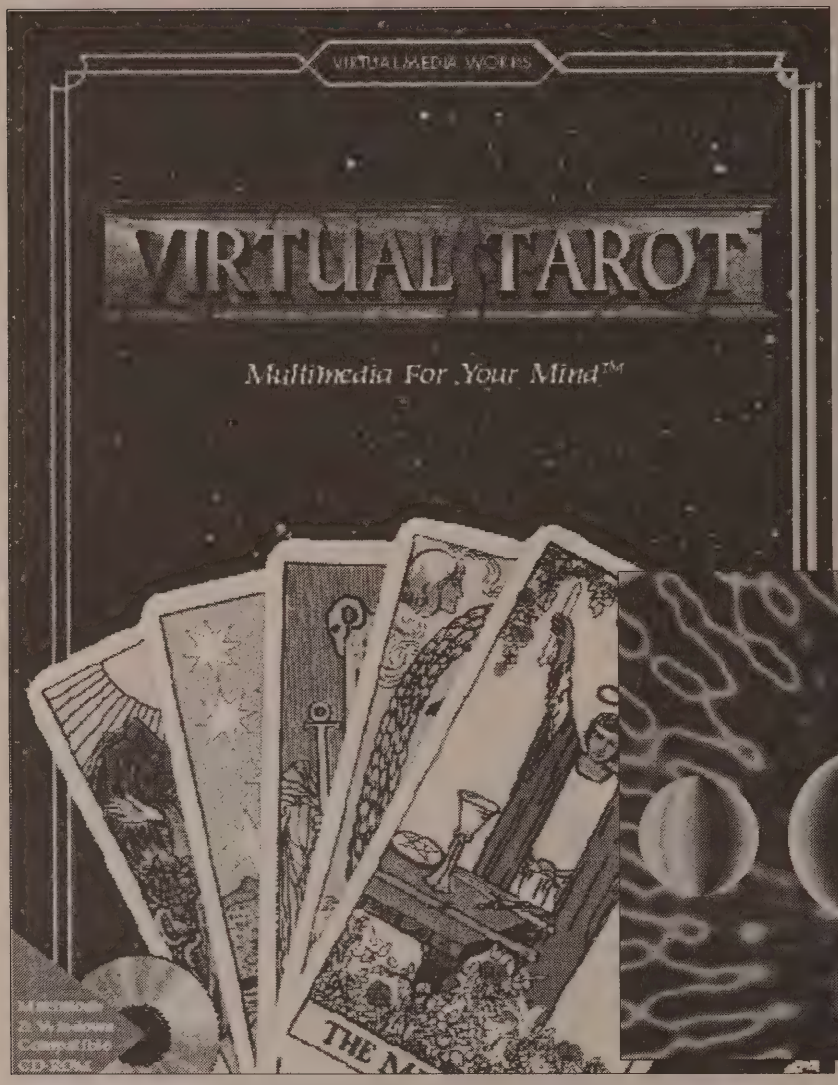
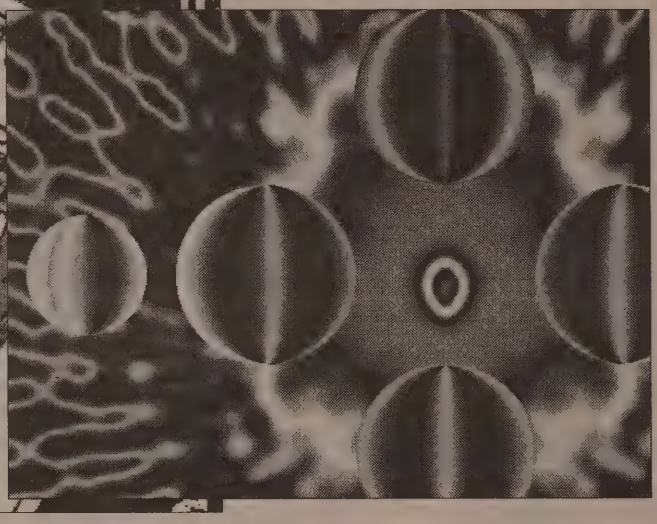




One, "UnDo Me," presents a choice of relationships, behaviors, and outcomes within a traditional pop song structure. The other, "House Jam," lets you trigger video and sound samples with mouse clicks over several endless basic beats.

In other areas, simply moving the mouse around will bring up visuals and change the music. Besides that, the CD-ROM contains archives of early MediaBand members' QuickTime, parts of the business plan, and assorted commentary on the big old/new world of media and its multimutations, making it a fascinating overall view of what the future may hold and how we got to where we are.

This is a close-to-essential title for anyone with an interest in multimedia. (Canter Technology, 101 Commonwealth, San Francisco, CA 94118; 1-800-387-0201: $60, Mac only)

4 PAWS OF CRAB—A NARRATIVE THAI COOKBOOK

Here's another utterly idiosyncratic CD-ROM, completely different in style and with a taste of Thai rather than bile.

There are four parts to this title: a collection of Thai recipes, a guide to the ingredients of those recipes, personal recollections of time spent in Thailand by an American woman and vice versa by a Thai man, and a historical overview of Thai and American history.

It sounds somewhat disjointed, and, in a way, it is. It's also quite charming with philosophical overtones and astute cultural commentary. Years ago keeping recipes on your computer was a bit of joke, but while 4 Paws of Crab can raise a gentle laugh with a couple of its recommendations, it does so deliberately and with a subtle sense of humor.

Of course, you can print out the recipes.

Some of the QuickTime is a bit dodgy, but that's hardly the central element of the title, and the short sound loops can be annoying.

Ultimately this is an enjoyable and useful look at two cultures, managing the mixed subjects in an elegant way that traditional media would find hard to do. (Live Oak Multimedia, Inc., 5901 Christie Ave., Suite 102, Emeryville, CA 94608; 1-800-454-7557: $44.95, Mac and hopefully Windows)

MEET MEDIABAND

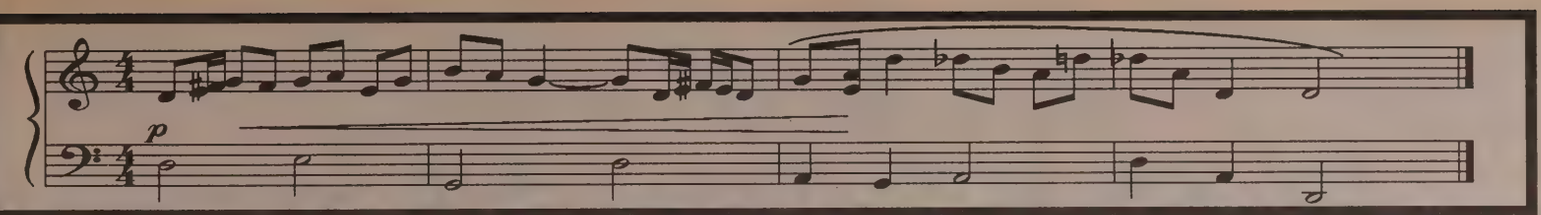
Marc Canter, an original multimedia godhead, is the guiding intelligence behind Meet MediaBand. It's a breakthrough product that demonstrates what will likely become a whole new category of audio-visual interactivity.

The central experiences are two "song-videos" with completely different interfaces that allow you to play with sound and images in various ways.

HEADCANDY

I recommend this more as a curiosity than as an excellent product.

It's real simple: five new Brian Eno songs along with full-screen, eye-candy visuals that expand beyond your computer screen when you wear the included prismatic glasses. Interactivity is virtually nil, being basically limited options that any CD



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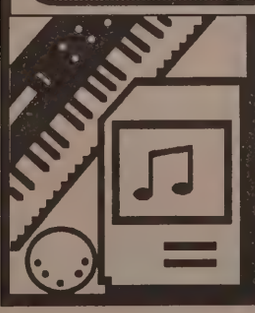

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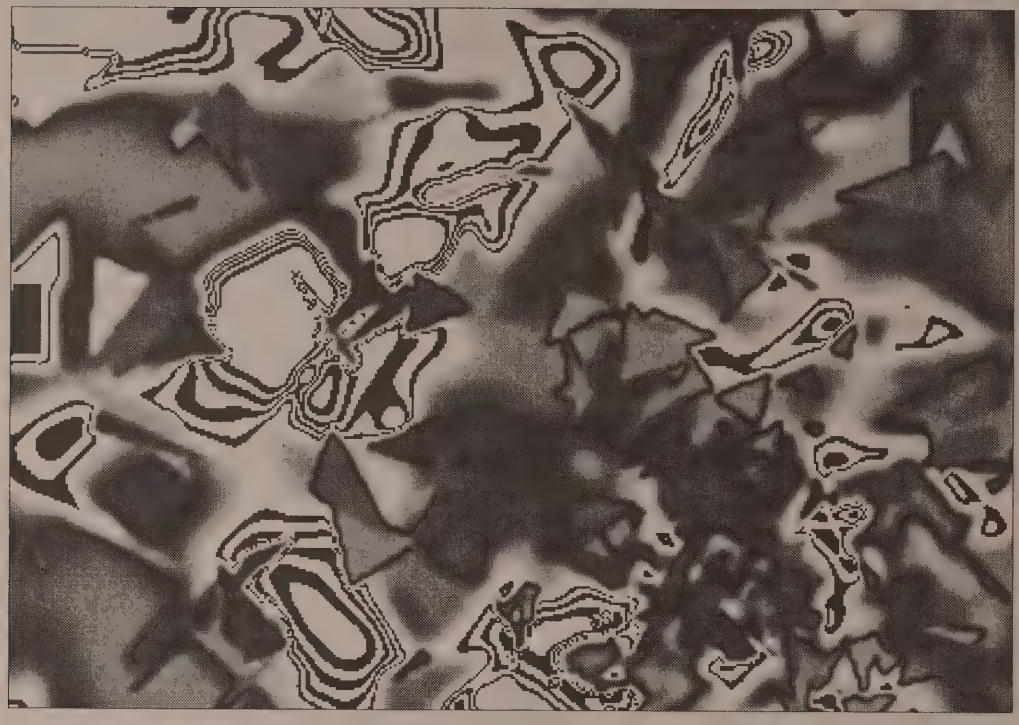


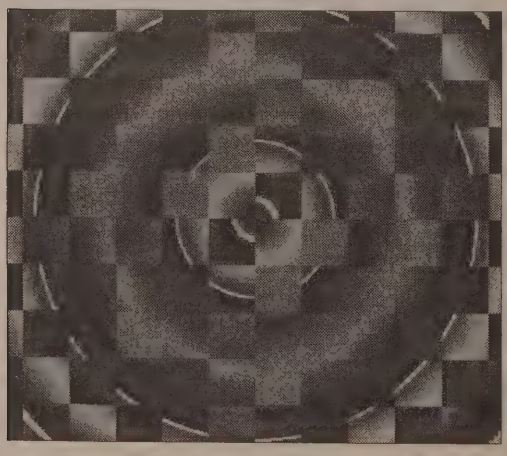
remote with video would offer.

Essentially, HeadCandy uses the computer as a playback machine and no more. The music is a continuation of Eno's electro/beaty/shimmering Nerve Net style and generally well coordinated with the visuals, which are—you guessed it—trippy in the extreme.

HeadCandy taxes computers and will almost certainly not run smoothly. I tried every trick suggested in the booklet and then some, without complete success. Ion recommends that you run it off your hard disk, claiming that it only requires 2 MB; actually it takes up almost 8 and the performance is not dramatically improved.

Frankly, you should get someone to give it to you as a gift; it's little more than a novelty item that you'd probably kick yourself for spending money on—but it's a kinda fun novelty item.

The audio-only version will be available on regular CD in 1995. (Ion, 11845 Olympic Blvd., Ste. 1050, Los Angeles, CA 90064; 310/312-8060: $39.95, Mac only at present, Windows in January)



BLISS SAVER & BLISS PAINT

Multimedia and interactivity don't only come on CD-ROMs as this fabulous screen saver, its creative application, and its vast collection of moving paintings and accessory modules shows. If there's one product here that absorbed my time with the pleasures of playing and thinking about what I was doing (or attempting to do), this is it.

Really it's four products: the screen saver has some limited but effective interactivity, letting you select designs and manipulate colors; with Paint you can make your own screen saver patterns; Gallery is additional "canned" designs; and Geometric is additional scribblers and distributors used in making your own paintings, along with yet more "canned" art.

The art is trippy and gorgeous—real eye candy. In the Paint application you have a great deal of control over what's on the screen, and can fairly quickly learn how to produce specific results. At advanced levels you can hook up a MIDI device and play visual music, as developer Greg Jalbert does with D'Cückoo and other musicians, including Brian Eno, are starting to do.

Stick an old-fashioned CD in the audio and Bliss Paint in your computer, and you've got something considerably more sophisticated than HeadCandy; something you could spend a lot of time with. (Imaja, PO Box 6386, Albany, CA 94706; 1-800-294-6252: Saver $49.95, Paint $79.95, Bliss Gallery $29.95, Geometric Bliss $39.95, Mac only)

AMERICAN VISIONS—20TH CENTURY ART FROM THE ROY R. NEUBERGER COLLECTION

There are a few things this CD-ROM doesn't do that I wish it did—primarily a slide-show function and easier navigation—but it's a fabulous collection of pre-digital art that looks great on a computer screen.

There's also plenty of ancillary information from critics and the artists themselves; significant events that occurred in the year of the painting are also presented, adding valuable context.

In the cultural line of what young aesthetes do, before multimedia it was rock'n'roll and before that it was painting. Check the QuickTime of Jackson Pollock at work for some fast confirmation of that assertion.

While no substitute for visiting a museum, this is undoubtedly a CD-ROM that the traditional art lover will find interesting. (Eden Interactive, 224 Mississippi, San Francisco, CA 94107; 1-800-743-3360: $99.99, Mac and Windows)

VIRTUAL TAROT

It may not be appropriate to think about Tarot at Christmas, but surely some belief systems in California are broad enough to include both. I myself am a skeptic about the Tarot, but find that it can sometimes have an unnerving closeness to the hidden currents of my life.

continued on page 221

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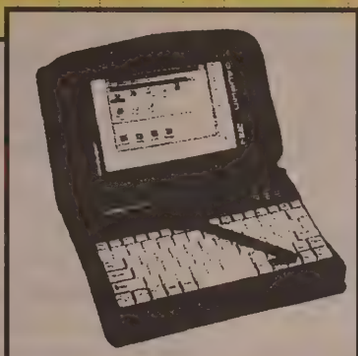

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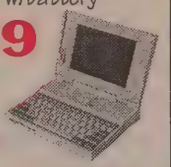

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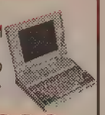

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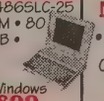

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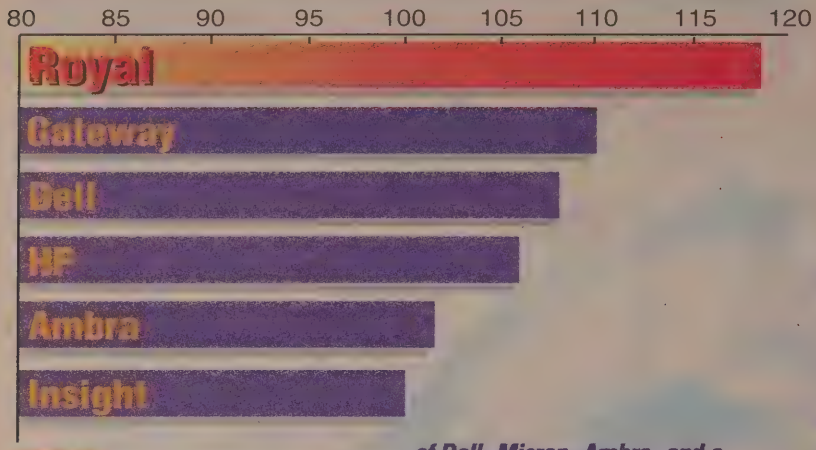

PC MAGAZINE
Sept. 27, 1994

"...This combination should satisfy most users--especially those who need to run high-end Windows graphics software..."

TOP Rated Performance

PC Magazine rates Royal tops in performance (September 27, 1994). Once again, our lead in new technology puts us ahead of the game. ***Ahead of Gateway. Ahead of AST. Ahead of Hewlett Packard. Ahead of Dell, Micron, Ambra, and a host of others.***

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- **4X CD-ROM drive 600KB/sec**
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- **Voice recognition software and mic.**
- **14 MultiMedia CD titles**
- 1.44MB & 1.2MB FDD, hi-res mouse
- 2S-1P-1G ports, 101 enh. keyboard

i486™ DX2-66	***$1,945***
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- Hi-res mouse, 1P-2S-1G, 1.44MB FDD

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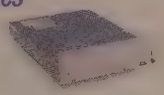
4XCD-ROM Drive



With quadruple the processing power, 4X CD-ROM drives give you fast data transfer rates – up to 600KB/sec – for even-running, full motion video without "the shakes." Quadspeed CD-ROMs are nearly twice as fast as a triple-speed CD-ROMs.

TRUE Sound 16-bit DSP

PC Magazine recently called it "the perfect sound card" for today's PC. Compatibility with all major sound standards, speech recognition, digital signal processing (DSP) for high fidelity sound at up to 20 million instructions per second, and true 16-bit record and playback. Plus MIDI, "special effects" like Q-Sound ("surround sound") and reverb, for audio realism so surprising you'll call it "True Sound".

MultiMedia CD Bundle

Royal bundles 14 sound- and action-packed CDs for your personal enjoyment. Includes games, entertainment, presentation software, and complete multimedia encyclopedia.

4 PCI Slots

Whereas most PC makers give you only 2 or 3 PCI slots on their motherboards, Royal gives you 4 PCI slots. That means you'll have 2 open 32-bit PCI slots for future uses, like networking, additional controllers, and other future high-end PCI cards. And Royal's roomy cases means many open slots and bays for add-on cards and drives of all kinds!

Voice Recognition System

- *Hardware, mic & software included*
- *Runs in memory, under applications*
- *Frees hands for typing*

FACT FILE

Royal Media Master IV

SUITABILITY TO TASK	
Windows applications	EXCELLENT
DOS applications	GOOD
Expandability	EXCELLENT

Ratings based on PC Magazine's "Pentium Powerhouses" review of forty 90MHz Pentium systems.

Sept. 27, 1994

intel inside

ROYAL TRUE SOUND!

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- **16bit Orchid Gamewave 32** sound, 2 speakers
- 7-bay tower, enhanced 101-keyboard
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- 256K fast write-back cache
- PCI IDE hard disk controller
- **420MB** 11ms IDE hard disk
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- **Wingraph** 64 video graphics accelerator, 1 MB RAM, 1280x1024 resolution
- **Double-speed CD-ROM**, Photo CD compatible, 300 KB/sec, 4 CD titles
- **16bit Orchid Gamewave 32** sound, **Digital Signal Processing**, 2 speakers
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- Choice of desktop or mini-tower
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- **ATI mach64 PCI graphics** engine, **2MB** RAM, 1280x1024 resolution
- 1.44MB 3.5" floppy disk drive
- 101-key enhanced keyboard
- 7-bay tower, dual fans
- Hi-res mouse, 2S-1P-1G

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Pentium™-66	*$2,445*
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- **Enhanced-IDE PCI HD controller**
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- **Royal 64-bit video** PCI accelerator, **2MB**, 1280x1024 resolution
- 1.44 MB 3.5" floppy disk drive
- 101-key enhanced keyboard
- 7-bay tower, dual fans
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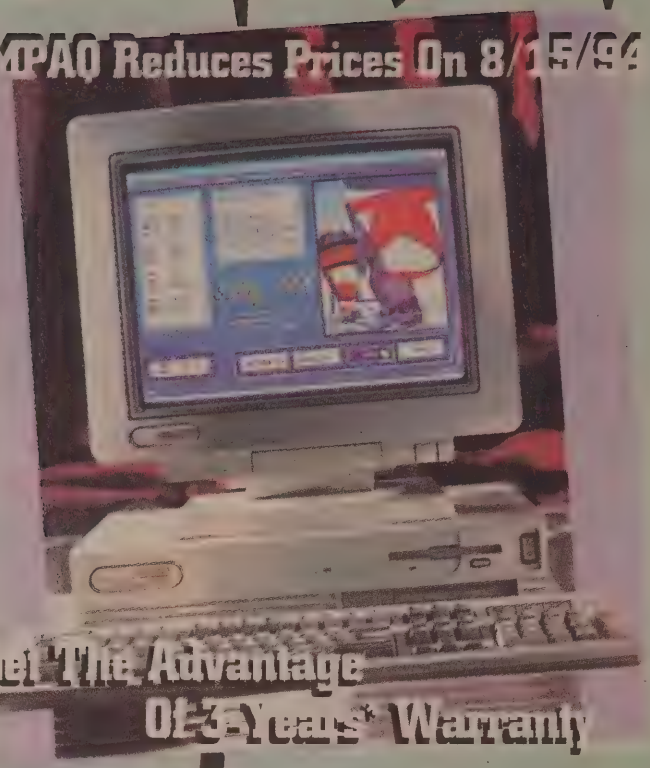

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MACWORLD COMPLETE MAC HANDBOOK

Jim Heid's *Macworld Complete Mac Handbook + Interactive CD Third Edition* ($39.95, IDG Books) is, at 1080 pages, a veritable megalith of Apple lore. Heid is the "Working Smart" columnist for *Macworld* magazine, and he must have worked late a lot of nights to squeeze this encyclopedia of everything Mac-ish between two covers.

He starts where you started, buying a Mac. The family lines of the breed are charted; you get pointers for navigating the interface, and then introductions to the first kinds of work you would do—word processing, spreadsheets, databases, and then on to desktop publishing.

We aren't just talking tips here. The chapter on Fonts and Typography alone is forty-four pages, as much on fonts as covered in some DTP books. Then graphics, presentations, and on to telecommunications. He hits HyperCard and optical character recognition (OCR), and gives a lot of attention to multimedia and QuickTime, with music and MIDI, and then all of the hardware and software involved in expanding your Mac.

One of the strongest benefits of this book is Heid's clear way of presenting information, so that beginner or power user can find what they need quickly.

The CD-ROM is an interactive combination playground, tool room, and home shopping network. It includes Heid's Handbook Interactive Sidebars—companion files to be used as illustrative support for topics in the book. There's a huge section of demo files from the star developers in the Mac constellation like Adobe, Macromedia, and Stratus. The bulging BMUG (Berkeley Macintosh User's Group) folder has dozens of games, utilities, fonts, and graphics, with shareware and freeware that can become yourware.

In all, this massive combo title is an invaluable resource and companion to your Mac.

MULTIMEDIA: MAKING IT WORK

Tay Vaughan, a designer-developer who has been-there/seen-that, has compiled a solid overview of all the building blocks of producing multimedia for Mac and Windows, covering hardware, software, platform configurations, audio, video, animation, and CD-ROMs.

His book, *Multimedia: Making It Work, Second Edition* ($34.95, Osborne/McGraw-Hill, 608 pp.), is outstanding not only for being thorough, but for its recurring and informative reality checks. Especially noteworthy in this regard is the section called "Assembling and Delivering a

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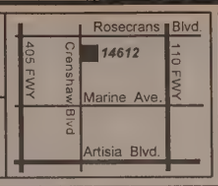

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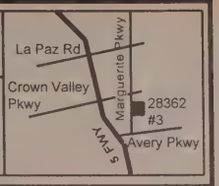

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MultiMedia & BEYOND

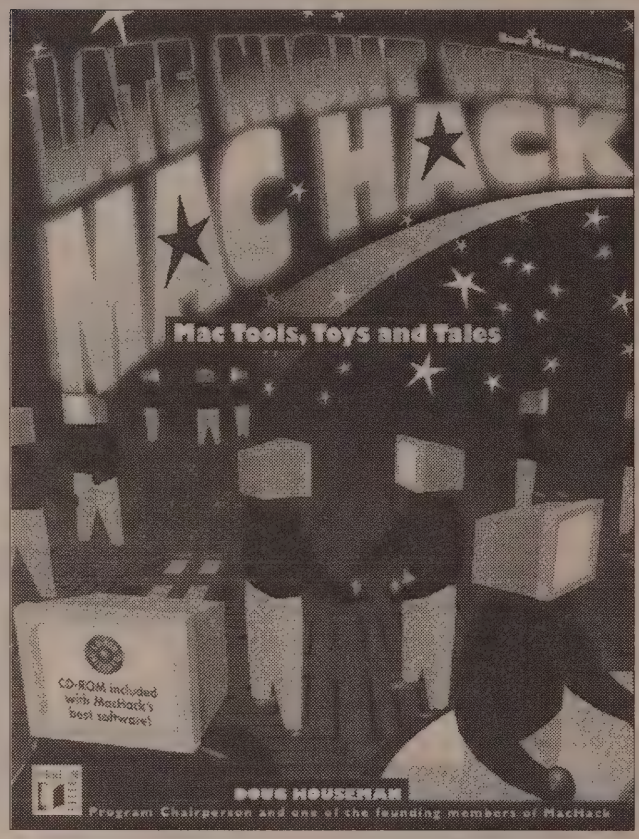
Project," which includes examples such as a production flowchart by Brian Blum.

The CD-ROM is packed with everything from Macromedia for the Mac and Windows, to limited working versions and demos of applications like Action!, MacroModel, and Director.

PHOTOSHOP FILTER FINESSE

True Adobe Photoshop artists may disappear from sight once they get their hands on *Photoshop Filter Finesse* by Bill Niffenegger ($45, Random House Inc., 362 pp.). The author covers the whole microuniverse of special effects and filters for Mac and Windows, from Photoshop native to third-party filters; he even explains how some obscure and forgotten graphic applications can use filters.

The book is richly illustrated in black and white and in color, so that all these case studies and examples can help you in your previsualization for design. The CD-ROM contains sixty Mac and eleven PC filters, and lots of backgrounds, textures, and demos.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ENCYCLOPEDIA OF GRAPHIC FILE FORMATS

The *Encyclopedia of Graphic File Formats* by James D. Murray and William Vanryper ($59.95, O'Reilly & Assoc., Inc., 982 pp.) is a definitive resource for graphics professionals and developers who need to get those pixels right for every application. The authors cover graphics concepts and programming, including such topics as types of graphic data, truecolor, palettes, and dealing with color. They provide animation and multimedia format information, compression, and JPEG and MPEG specs.

The CD-ROM is a collection of original file format specifications documents from vendors such as Adobe, Aldus, Apple, IBM, Microsoft, and SGI.

BYTE GUIDE TO CD-ROM

The *BYTE Guide to CD-ROM* ($39.95, Osborne/McGraw-Hill, 405 pp.) by Michael Nadeau, a *BYTE* magazine senior editor, does indeed tell you "everything you always wanted to know about CD-ROM" for Macintosh and Windows. It's really intended for those of us who may want to create multimedia documents and transfer them to CD, an area where there's more at stake than on the playback-only side of the technology.

The author gives a clear and complete overview of CDs, including future directions of the medium. He covers installation, burning ROMs, pressing software, networking players, and trouble-shooting; there's also a standards guide and a buyer's guide. The CD-ROM has limited working versions of Macromedia Authorware, Fractal Painter, reference books, clip media, and shareware for the PC.

RAY TRACING FOR THE MACINTOSH

We may have come to expect most of our graphics to have those richly rendered and marbled textures that come from ray tracing in computer graphics, but feel that it is beyond our desktop.

Eduard Schwan's *Ray Tracing for the Macintosh CD* ($32.95, Waite Group Press, 180 pp.) can meet your Mac at least halfway. The CD-ROM includes a special version of POV-Ray (which is native to Power Macs) with the reference database and source code, and which has a very good preview mode.

This is not for the RAM-deficient or the programmatically challenged. But it is so cool when it works!

LATE NIGHT WITH MAC HACK

Late Night With Mac Hack: Mac Tools, Toys and Tales ($29.95, M&T Books, 244 pp.) will keep you off the streets at night and at home with a code. This is a "what I did at summer camp" compilation of the goings-on at the renowned annual Mac Hack Conferences, where three hundred of the top Macintosh programmers gather. You'll get the skinny on the way System 7 was shaped and where programmers are pushing the envelope on the next generation of Macs. The CD-ROM contains one hundred of the best hacks, including NetBunny, Jurassicon Park, DropSave, and Wavy.

VIRTUAL PLAYHOUSE

But if you want it all now, Jonathan Price's *Virtual Playhouse for Macintosh* ($39.95, Hayden Books, 783 pp.) is your key to a multimedia holiday. On the pages and in the CD-ROM, you will find explanations and examples of games, artificial life, fractals, painting and drawing, 3-D, morphing, image editing and manipulation, QuickTime, sound, multimedia, virtual reality, HyperCard, narration, telecommunications, and design.

It helps if you start this on a weekend. ■

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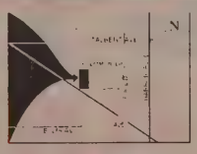

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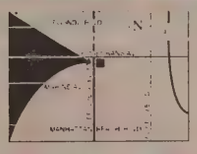

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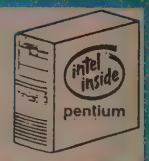

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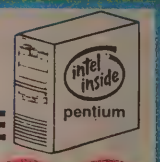

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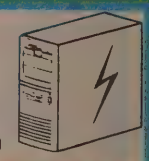

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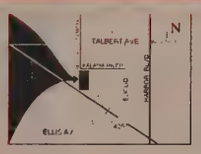

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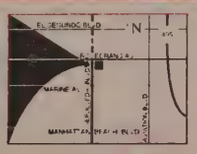

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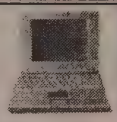

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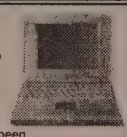

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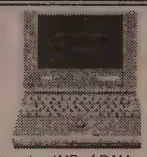

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Use the 4MB Flash Storage Card to increase the storage capacity of your Newton MessagePad. Newton MessagePad lets you store up to 250 name cards(name, title, company, address, and three phone numberss), 200 notes of up to 50 characters, 500 calendar appointments, and 35 screens of uninterpreted text and drawings. This 4MB Flash Storage Card can store sixteen times as much information as your Newton MessagePad. The 1MB Storage Card can store four times as much information.

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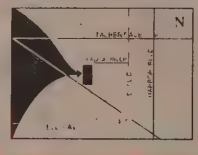

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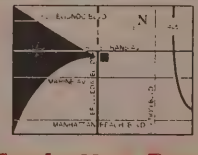

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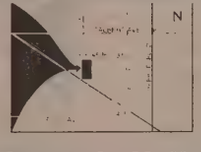

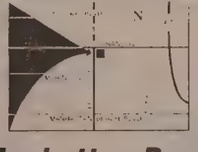

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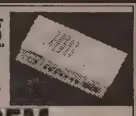

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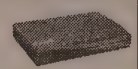

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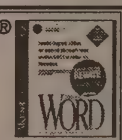

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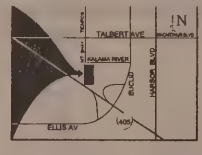

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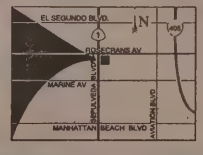

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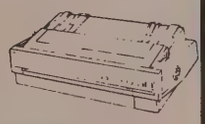

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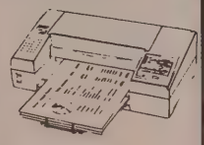

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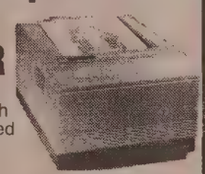

- 300 X 300 dots per inch
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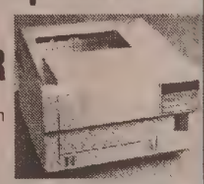

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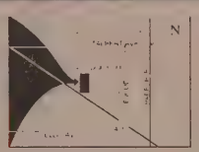

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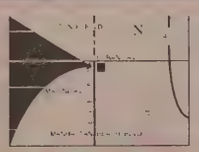

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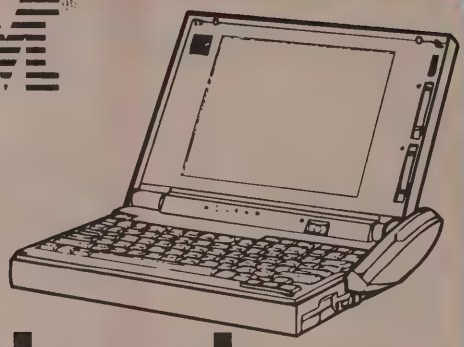

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Preloaded Multimedia Software: Compton's Encyclopedia • The Discovers • Undersea Adventure • IBM Photo Display • Recording Session • Introduction to Multimedia • Monologue for Windows™ • Sound Card Utilities • MCS Music Rack • Music Mentor
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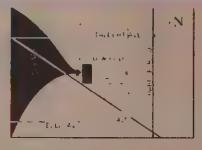

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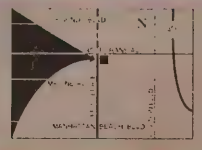

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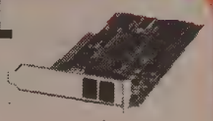

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- Improves worker productivity w/faster data transfer and reliable connections
- Protects your investment with a 5 year warranty, backed by AT&T

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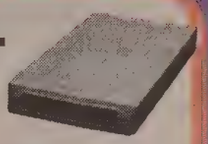

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5 Year Warranty
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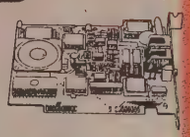

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Hayes Compatible
for IBM PC
5 Year Warranty
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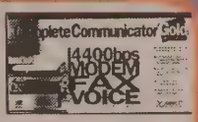

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- 1000 password protected mailboxes

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Maxfax Software
5 Year Warranty
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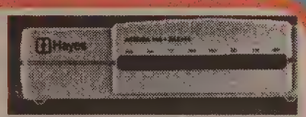

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- Group 3 Fax
- V.42, V.42bis, MNP 2-5
- Cables included

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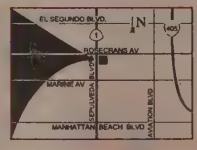

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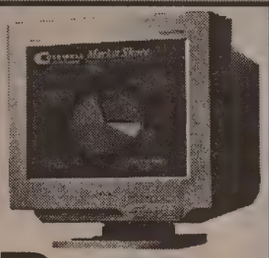

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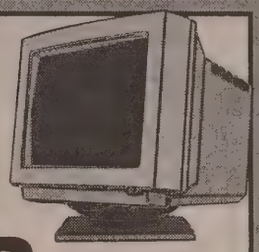

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SuperScan™ 15s
Non-Interlaced
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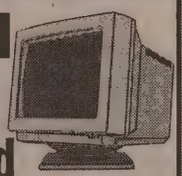

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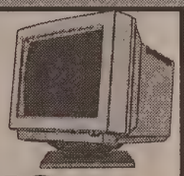
2V
MULTISYNC
14" SUPER VGA MONITOR



1024 x 768 • Flat Screen • .28 dpi
Non-Interlaced
#1926185

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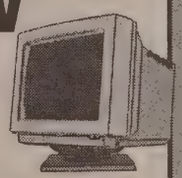
NEC 3V
Non-Interlaced
1024 X 768
.28mm
15" SUPER VGA MONITOR



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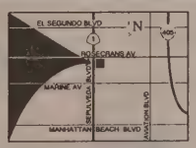

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Terminator and FWB Software
MODEL 85
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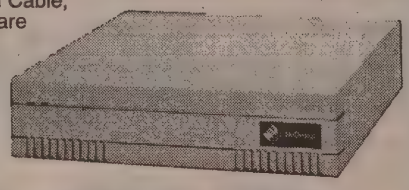

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MODEL 170
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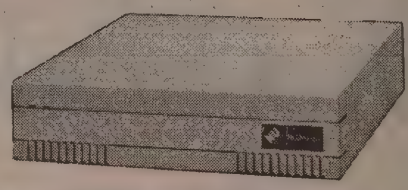

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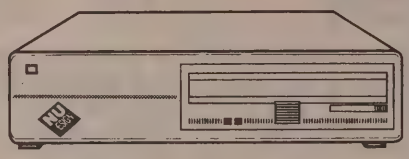

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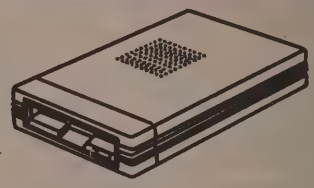

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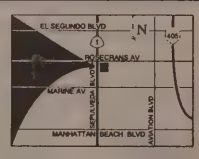

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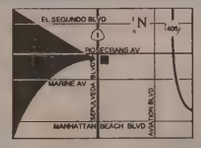

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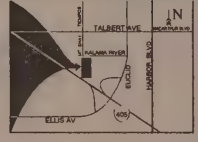

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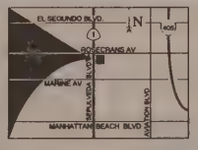

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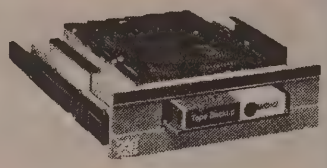

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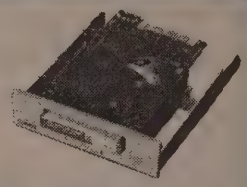

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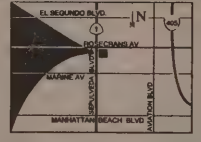

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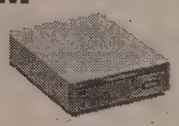

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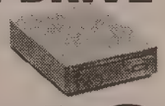

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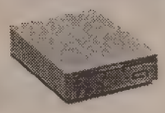

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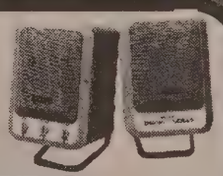

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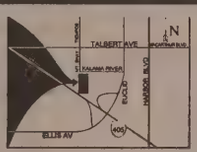

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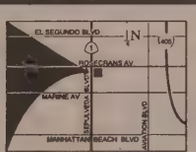

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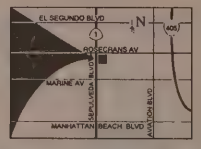

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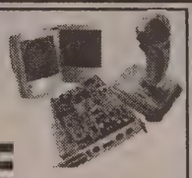

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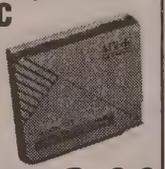

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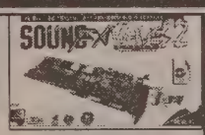

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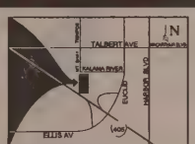

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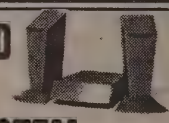

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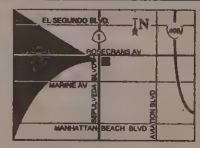

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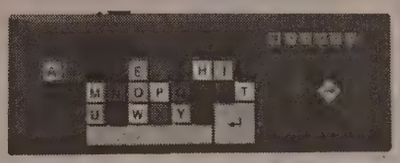

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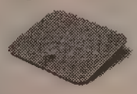

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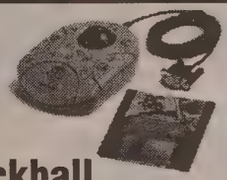

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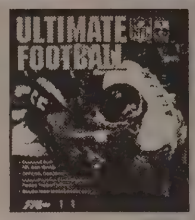

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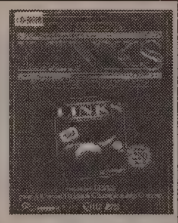

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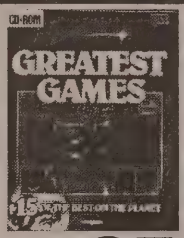

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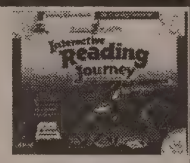

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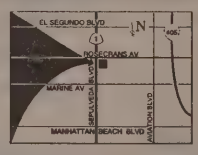

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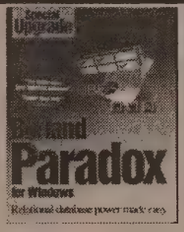

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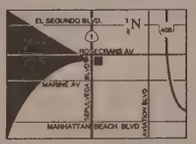

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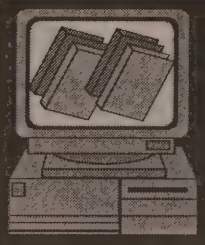

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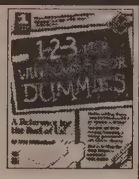

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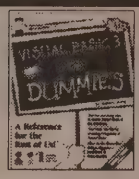

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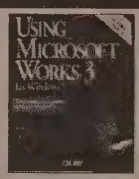

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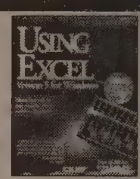

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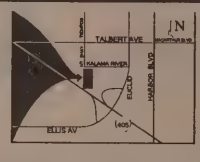

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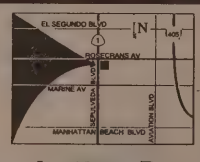

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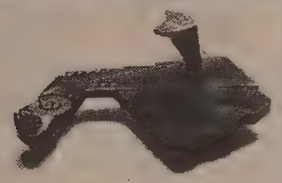

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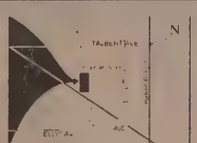

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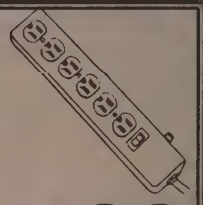

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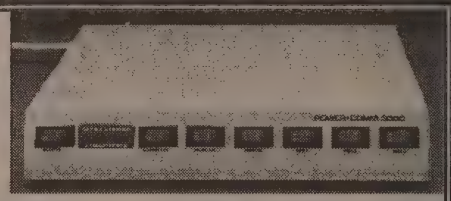

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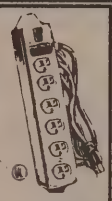

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Prices Good Through December 6, 1994

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CLOSED 11/24/94

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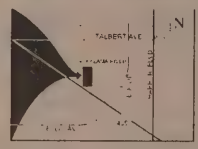
SATURDAY
9AM - 9PM
SUNDAY
9AM - 8PM



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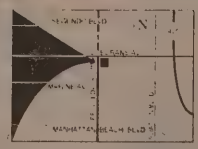

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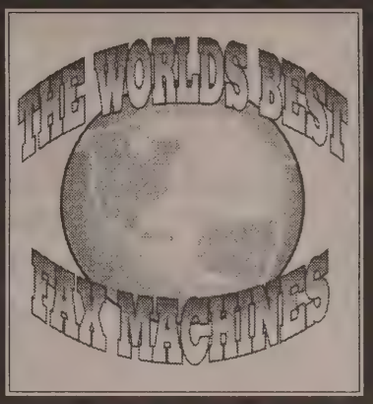
brother®

THE WORLD'S BEST FAX MACHINES



brother

THERMA PLUS PAPER

FAX MACHINE
WITH PAPER CUTTER

ACS ANTI-CURL SYSTEM

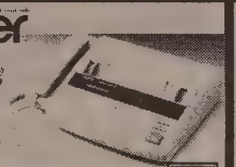
Brother's breakthrough fax machine incorporates newly developed therma plus technology which uses fax paper that feels like plain paper and reduces print fading (lasts 3 times longer than thermal paper under normal filing conditions, and you can even use a highlighter!). Other features include, 10 page document feeder, 15 station memory, 16 level grey scale, activity report, polling and much more for only...

$279

Model
FAX-620
#1896510

brother

THERMA PLUS PAPER



FAX MACHINE
WITH PAPER CUTTER & 32 LEVEL GRAYSCALE

ACS ANTI-CURL SYSTEM

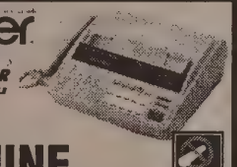
From Brother the high tech home office leader come this feature laden fax machine with 32 level grayscale for enhanced contrast reproduction, 60 station memory, 10 page auto document feeder, anti-curl mechanism, smoothing, multiple resolution transmission, 16 digit LCD display, activity report, Polling, next fax reservation, and much more. Now just....

$299

Model
FAX-640
#1917437

brother

THERMA PLUS PAPER



FAX MACHINE
WITH 1MB MESSAGE CENTER & PC LINK CAPABLE

Brothers revolutionary fax machine offers a digital message center for either18 minutes of recording, up to 50 page of memory for out of paper reception, or you can configure the storage memory to be usedon a first come first serve basis. The optional missing link will allow this fax machine to act as a PC/fax modem, a scanner, and a printer! Other feature include anti-curl system, uses ThermaPlus paper, quick-scan, 164' paper roll capacity, 15 page document feeder, auto cutter, sequential broadcasting, and 60 number memory just to name a few.Now only...

$399

Model
FAX-820
#1925195

brother

PLAIN PAPER FAX
WITH 256K MEMORY

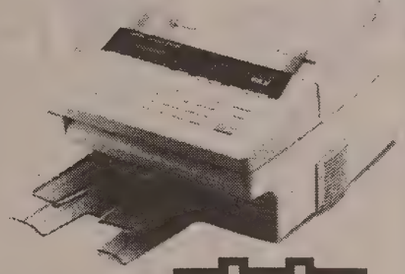
Brother's done it again! Last year Brother broke the $400 price barrier in paper cutter Fax, and for an encore, Brother has destroyed the $799 stand alone plain paper Fax barrier with this unbelieveable value. Its 200 sheet paper cassette, 30 page auto document feeder, on-screen programming, "smoothing" enhanced image resolution, 48 digit LCD display, multiple resolution transmission, 32 level grayscale, 160 station memory, and Fax/Tel Switch makes this the best value you will find at only.....

$599

Model
FAX-980
#1801828

We're at your side.

brother



missing link

PLAIN PAPER LASER FAX AND COPY SYSTEM
WITH PC LINK CAPABILITY

Brothers state-of-the-art Laser fax machine combines laser print quality with copier capabilities of up to 99 continuous copies along with reduction and enlargement capabilities, and PC Link capability enabling you to utilize the laser fax machine as either a Scanner, PC/Fax Modem, or a printer! Other features include 256k memory for out of paper reception or sequential broadcasting, 30 page document feeder, 200 page sheet paper tray, 140 station memory, 32 level gray scale, and much much more! The best home office investment you will ever make at just...

$899

Model
PPF-2500
#1925173

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NOVEMBER 24,
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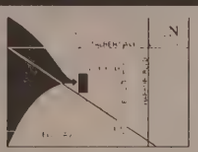

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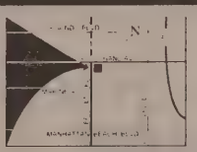

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GET ORGANIZED AT FRY'S ELECTRONICS

ORGANIZERS

SHARP 34K PERSONAL ORGANIZER

Perfect for the business person on-the-go, this compact data bank incorporates a 14 x 3 line display, built-in calendar, schedule, phone /memo, memo pad, expense, clock, anniversary, and calendar functions as well as QWERTY keyboard to simplify data entry. Once you've used this electronic marvel, you won't leave your home or office without it.

$49.95

Model YO-110
#1741872

CASIO B.O.S.S. WITH 128K MEMORY

This business organizer scheduling system comes packed with powerful functions that are practical and easy to use. The QWERTY Keyboard, telephone directory, calendar, memo function, schedule alarm, world time function, home time function, and schedule keeper will prove to be an invaluable tool in keeping your busy days in order. An excellent investment at...

$119.95

Model SF-7900
#1956818

SHARP 512K PERSONAL ORGANIZER WITH TOUCH SCREEN TECHNOLOGY

This Sharp Wizard lets you leave your portable computer at home but puts the power of that computer in your pocket! Here's a small sampling of the innovative features. Touch screen technolog ywhich allows you to write or draw on the screen using the Wizard pen, filer which organizes related data into folders that can be transferred to another touch screen Wizard via infrared, and a true word processor with a large screen display and a keyboard that's 75% the size of a standard PC key board. The possibilities are endless at only...

$329

Model OZ-9600 II
#1797152

PALMTOP COMPUTERS

PSION SERIES 3 POCKET SIZED 512K COMPUTER WITH BUILT-IN SPREADSHEETS

Psion has redefined the state of the art in hand held computers with the new Series 3. It may be small, but this pocket-sized programmable computer comes equippedwith features found in desktop machines plus powerful built-in software, including a full specification word processor and outliner that's compatible with Microsoft word. When using the Series 3 you will quickly learn from the system of graphic displays and option list how easy the Series 3 is to use. And with Psion's unique Multitasking Operating System, as many of the facilities as you want can be used at the same time! Other features include an automatic phone dialer, world information, a time and personal management file, powerful graphics programming language (OPL/W) which will enable you to write your own applications and two expansion ports for plug in SSD devices for unlimited memory and software.

$399

Model SERIES 3A
#1843567

HEWLETT PACKARD Authorized Dealer 1MB PALMTOP COMPUTER WITH 80x25 FULL SCREEN MS-DOS 5.0 & BUILT-IN POCKET QUICKEN

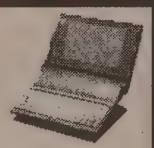
The smallest, lightest HP PC ever comes equipped with complete organizer software to manage your time, tasks and data, plus you can retrieve information instantly with a full range of built-in personal productivity tools. The pull-down menus and dialogue boxes make it simple to master the familiar commands, and the high-resolution display with zoom option is easy to read ! With Lotus 1-2-3 built-in you will have full spreadsheet capability, including graphics and macros. Also includes CC:Mail built-in. Now only...

$549

Model HP-200LX
#1941670

OMORON 1.9 lbs. SUB-NOTEBOOK

RUNS ON 4 AA BATTERIES UP TO 10 HOURS



2MB RAM • 2MB ROM • 2 PC MCIA Type II Slots Fax/Modem Built-In • Serial/Parallel • 640 X 400 Resolution Preloaded Software: DR DOS • Bitfax LapLink XL • BitCom DataSel Gold • Contact Manager. AA batteries not included By OMRON.

$599

Model TOUCAN
#1809653

PERSONAL COMMUNICATORS

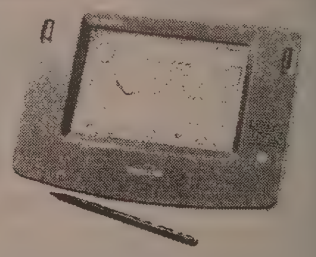
CASIO PERSONAL DIGITAL ASSISTANT DOS COMPATIBLE WITH GEOS OPERATING SYSTEM

Now an amazing device, no bigger than a small paperback book, can store your hand written notes and sketches, arrange your calendar, keep track of hundreds of phone numbers and addresses, help organize your personal finances, perform complex mathematical calculations, give you easy access to electronic mail and a host of sophisticated on-line information services. With up to 100 hours of operation from 3AA Alkaline batteries, and S-RAM or Flash card compatibility, the versatility and performance of this PDA is unmatched at only...

$399

Model Z-7000
#1815308

SONY Magic Link PERSONAL INTELLIGENT COMMUNICATOR



A revolutionary concept in electronics which integrates the most useful features of personal computers, telephones and pagers in a handheld, portable unit. By incorporating Magic Cap™ communicating applications platform and Telescript™ technology, the Magic Link™Communicator represents a leap forward in the use of technology to enhance your lifestyle. Features include integrated Fax/Data Modem built-in mic/speaker, Pocket Quicken, PenCell Spreadsheet, Spell Finder, Datebook, Notebook, Calculator, File Cabinet, mind game software, and much more. Magic Link™ will also facilitate various modes of communication including Phone, E-mail, Fax, Pager and Infrared, as well as supporting AT&T PersonaLink℠ Services and America Online service.

$899

Model PIC-1000
#1959305

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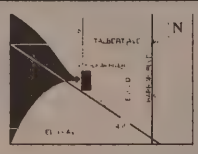

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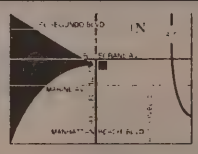

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ANSWERING MACHINES

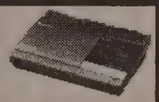
Panasonic
ANSWERING MACHINE

Answering System with Auto-Logic Operation, Tone Remote Control, Digital Display, Message Memo Recording and remote turn on, Auto-Logic Operation automatically rewinds, plays messages, stops at the last message and resets itself at the touch of one button.

$39.99

Model KX-T1000
#1498194

Panasonic
DUAL MICRO CASSETTE ANSWERING SYSTEM

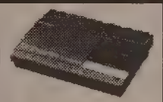


Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

$69.95

Model KX-T2100
#1740208

Panasonic
DUAL MICRO CASSETTE ANSWERING SYSTEM
WITH VOICE TIME/DAY STAMP

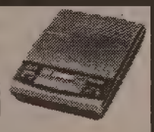


Panasonic's new dual micro cassette answering system offers an LCD Call Counter, marker message, room monitor, auto disconnect, electronic auto disconnect, electronic volume control, audible message alert, and much more for only...

$89.95

Model KX-T2300
#1740219

Panasonic
TWO LINE ANSWERING MACHINE
WITH VOICE TIME/DAY STAMP



Perfect for the home or office, this Panasonic two line answering machine offers voice time/day stamp, voice prompts, 2 variable greeting messages, room monitoring, message alert, call screening, auto interrupt, toll saver, and more. Now just...

$129.95

Model KX-T5300
#1768084

BUSINESS PHONES

Panasonic
SPEAKERPHONE

For the office or home, this phone has all the features you need. It has a speaker phone, 28 station automatic dialer, automatic redial and much more.

$49.95

Model KX-T2315
#1530100

Panasonic
TWO LINE SPEAKERPHONE

A perfect compliment to your home or office, this two-line speakerphone comes equipped with 3-way conferencing, 20 number programmability, seperate ring switches for each line, and a local mode function. Now only...

$69.95

Model KX-T3120
#1510676

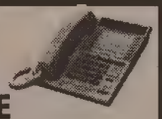
Panasonic
2-LINE SPEAKERPHONE
WITH LCD DISPLAY

From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$89.95

Model KX-T3175
#1745122

Panasonic
THREE LINE SPEAKERPHONE
WITH LCD DISPLAY



From Panasonic comes this fully featured 3-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 48-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$169.95

Model KX-T3185
#1768039

10 CHANNEL CORDLESS PHONES

Panasonic
10 CHANNEL AUTOSCAN CORDLESS PHONE

This cordless phone comes equipped with a retractable flexible rubber antenna sound charger technology, which helps filter out background noise resulting in enhanced sound quality, and 1-way paging between the base and handset. An excellent value at only...

$79.95

Model KX-T3850
#1764839

Panasonic
10 CHANNEL CORDLESS PHONE
WITH QUICK CHARGE & SECURE GUARD SYSTEM

Panasonic has developed the latest in cordless technology by incorporating a Quick Charge system that will enable you to recharge its battery in one hour providing 7-day standby or 3 hours providing 21-day standby! The Secure guard system can help keep your conversations private and help prevent eavesdropping scanners or baby monitors. Other features include one paging, 10 number memory, last number redial, flash, auto security code settings and much more for only...

$118.95

Model KX-T3940
#1820915

Panasonic
10 CHANNEL AUTOSCAN CORDLESS DUAL KEYPAD SPEAKERPHONE
WITH SECURE GUARD VOICE SCRAMBLING

Panasonic's comes equipped with secure guard which scrambles your voice when others try to listen in on your conversations with other cordless phones, radios or even scanners! Other features include quick charge technology enabling to fully charge the battery in only 3 hours for 21 day standby, 2-way paging, intercom, 10 number memory, high gain antenna, and much more. All for only...

$159.95

Model KX-T3985
#1886160

Panasonic
10 CHANNEL CORDLESS SPEAKERPHONE
WITH DUAL MICROCASSETTE

This top of the line cordless dual microcassette answering system with sound charger technology delivers sound so clear, you will hardly believe your ears! Some of the features included are: 2-way paging, intercom, auto security system, message alert, 2-way and memo recording just to name a few. Now only...

$199.95

Model KX-T4400
#1802450

FAX MACHINES

Panasonic
FAX MACHINE
WITH PAPER CUTTER, SPEAKERPHONE AND ALL DIGITAL ANSWERING MACHINE

Panasonic line of fully featured fax machines start with this compact model which includes 64 level grayscale, super thermal paper compatible, paper curl reduction, 164' paper roll capacity, 15 page document feeder, distinctive ring, delayed transmission, paper save mode, telephone directory with alpha-search, 12 station one-touch with 28 station speed dialing, and much more. All for just...

$349

Model KX-F750
#1944282

Panasonic
PLAIN PAPER FAX MACHINE
WITH 20 PAGE MEMORY

The ultimate plain paper fax from Panasonic features a jumbo LCD display, 70 page paper cassette, adjustable letter/legal tray, 32 level halftones, polling, activity reporting, 20 page document feeder, broadcasting to 128 locations, fax transfer, enlargement and reduction copier functions, fax/tel switch, 28-station one-touch dialer, 100-station speed dialer, telephone directory with alpha-search, and much more! Now just.....

$799

Model KX-F3000
#1850626

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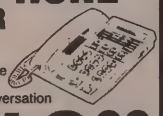
SERVICE, SELECTION & SAVINGS

SPEAKERPHONES

BELL Phones BY NORTHWESTERN BELL PHONES

SPEAKERPHONE WITH 13 NUMBER MEMORY



The convenience of a handsfree speakerphone allows you to do other tasks while having a conversation on the phone. Features include 13 number memory, auto redial, mute, flash, and more. An excellent addition to any home or office at only...

$19.99

Model 4350
#1917518

SONY.

SPEAKERPHONE WITH 32 NUMBER MEMORY

From the leader in cordless phone technology comes a new line of feature phones. This unit has a crystal clear speakerphone, 32 number memory and more!

$49.95

Model IT-D100
#1516878

Panasonic

LCD READOUT SPEAKERPHONE

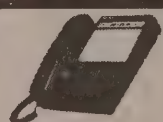
This outstanding value from Panasonic offers a 12-digit LCD readout for phone number, clock, call timer(minutes & seconds), and operating modes. Perfect for the home or office at only...

$69.95

Model KX-T2365
#163665

SONY.

TWO LINE FEATURE PHONE WITH SPEAKERPHONE



Phones with 2-line operation are relatively common, but this phone offers a distinctive ring for each line! The LCD indicator will tell you the number dialed and the time. Now only..

$79.95

Model IT-D250
#1516904

MULTI-LINE PHONES

BELL Phones BY NORTHWESTERN BELL PHONES

TWO LINE PHONE

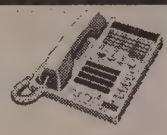
Perfect for the home office with multi-line needs, this 2-line phone from Northwestern Bell features line-in-use LEDs, 3-way conferencing, 15 number memory, hold, flash, pause, and ringer controls. An excellent value at...

$39.99

Model Easy Touch 2202
#1890905

Panasonic

TWO LINE PHONE



A two line phone doesn't have to cost a fortune. Panasonic has the low cost answer for you. This unit has a convenient auto dialer, conference calling and much more!

$69.95

Model KX-T3110
#1505313

Panasonic

TWO LINE SPEAKERPHONE WITH LCD DISPLAY

From Panasonic comes this fully featured 2-line speakerphone with LCD display, 3-way conference call, volume control for speaker and handset, 24-station one-touch dialer, auto redial, flash, separate ringer tone, line status indicator, memo dial, and save redial, all for only...

$89.95

Model KX-T3175
#1745122

AT&T

THREE LINE SPEAKERPHONE

AT&T's multi-functional centrex compatible 3-line speaker -phone comes equipped with page, intercom, 3-way conference, LCD display, 40 number memory, auto line selection, hold, do not disturb function, auto-redial, mute, programmable pause, call transfer, flash, seperate ringer controls, and more, all for only.....

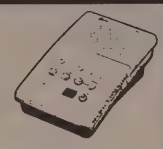
$179.95

Model 843
#1853892

ALL DIGITAL ANSWERING MACHINES

AT&T

ALL DIGITAL ANSWERING MACHINE



This AT&T answering system utilizes tapeless digital technology to ensure consistent recording quality over the life of the system. The convenience of new message playback, outgoing message bypass, remote system turn on or off and remote message recording makes this an excellent value at only...

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Model 1710
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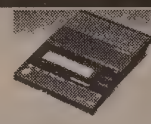
Model 700
#1964820

Panasonic

ALL DIGITAL ANSWERING MACHINE WITH VOICE TIME/DAY STAMP



This Panasonic all digital answering machine comes equipped with 30 minutes of total recording capacity and voice promps for time, AM/PM, voice remote menu, number of messages, pre-recorded greeting messages, and time/day stamp on each message. Other features include LCD readout, quick playback, message alert, room monitoring, 2-way and memo recording, and much more! Now just...

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Model KX-T8100
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Model 1872
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COPIERS

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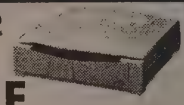
PORTABLE COPIER



This Sharp copier weighs in at just 14.8 lbs. and is amazingly compact and lightweight, making it easy to be carried or stored in a small place. Features include auto exposure control, auto start function, auto power shut-off mode, which completely cuts the power approx. 90 sec. after you finished copying. An excellent value at only.....

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Model Z-20
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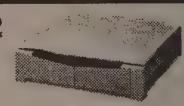

Compact and lightweight, this Sharp copier weighs only 17.5 lbs. and fits virtually anywhere! Yet, it even lets users make multiple copies up to legal size (81/2" x 14") originals onto a wide range of papers from 81/2" to 4" x 6", allowing an expanded range of applications. Other features include auto exposure, 50 sheet paper tray capacity, auto start function and much more! An excellent value at just.....

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Model Z-27
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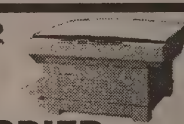
LETTER LEGAL COPIER WITH STATIONARY PLATEN



This durable Sharp copier utilizes a stationary platen, a space-saving feature that eliminates the possibility of the copier bumping into objects while in operation. The variable zoom ratio setting adjusts between 70% and 124% in 1% increments giving you more copying flexibility and versatility. Other features include large capacity 250 sheet tray, continuous copy (up to max. 50), auto start, and letter/legal capacity. An excellent value at...

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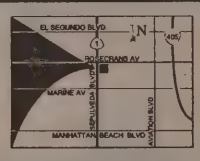

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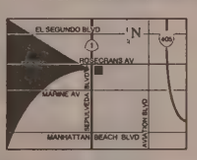

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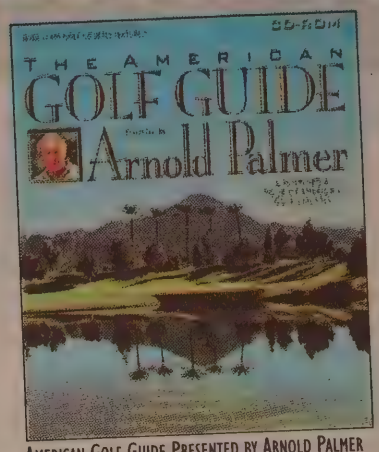

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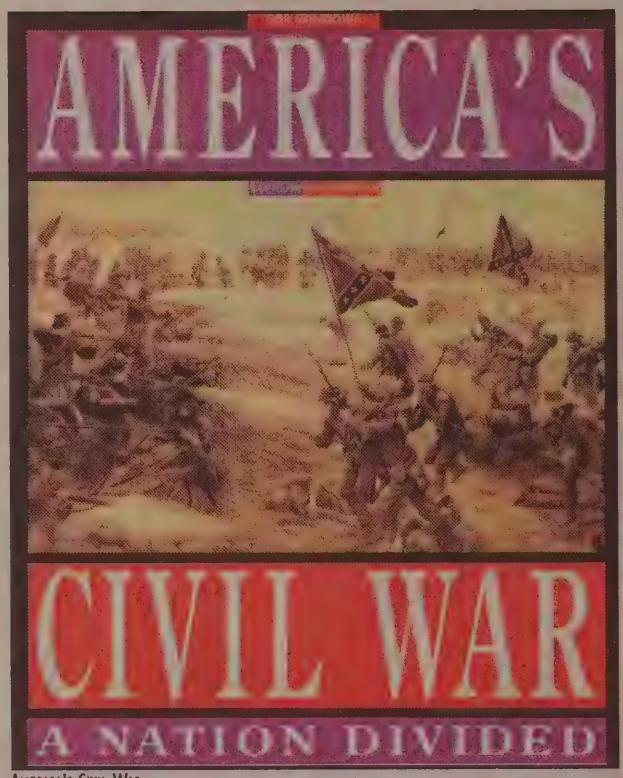

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American Golf Guide, a Windows-based CD-ROM, provides in-depth information for over 11,500 US golf courses, including course layouts, score cards, facilities information, color-coded weather maps, travel directions, hotel listings, and information on resorts, activities, and tourist attractions adjacent to the courses. It also includes more than five hundred color photographs of select courses, plus full-motion video clips of fifteen of the most scenic courses. Golf enthusiasts can see a course before playing it, plan a vacation that includes golfing, add a round of golf to a business trip itinerary, or simply satisfy their curiosity by "visiting" some of the most scenic and challenging courses in the US. ($59.95) DataTech Software, 6360 Flank Dr., Suite 300, Harrisburg, PA 17112. (717)652-4344.

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THE COMPLETE AFTER DARK SCREEN SAVER COLLECTION

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WORLD'S GREATEST SPEECHES

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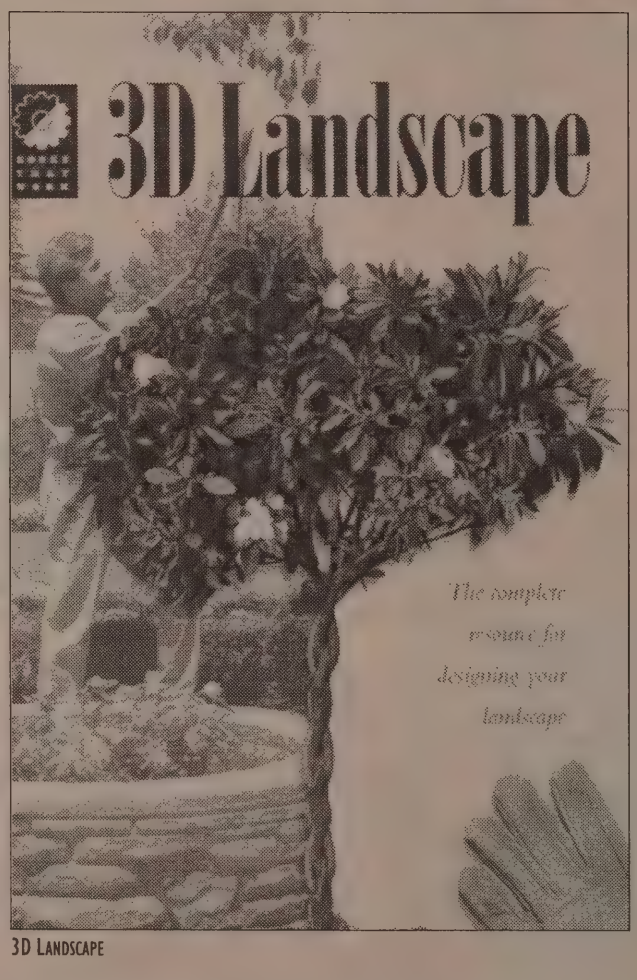

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America's Civil War: A Nation Divided, a well-researched, information-rich Windows CD-ROM answers all the questions anyone might have on the war between the states. Search its huge database by hundreds of attributes, including date, name, event, blockade, invasion, cavalry, retreat, profiteering, and many more. Famous battle grounds will come alive as you watch video clips with sound of reenactments. Over one hundred colorful maps depict everything from minor skirmishes to epic battles to colossal blunders. ($59.95) Software Marketing Corp., 9860 S. 51st. St., Bldg. A-131, Phoenix, AZ 85044. (602)983-3377.

THE PERFECT RESUME

The Perfect Resume, a Windows-based CD-ROM, helps users create effective resumes, write dynamic letters, and build a job search database. It includes fifty video clips with the advice of author and consultant Tom Jackson, over 140 sample resumes, a resume builder, a job search manager, and a "power letters" module with samples of cover and follow-up letters. The software also provides users the opportunity, free of charge for one year, to post their resumes on America Online's Resume/Talent Bank. ($40) Davidson & Associates, Inc., 19840 Pioneer Ave., Torrance, CA 90503. (310)793-0600.

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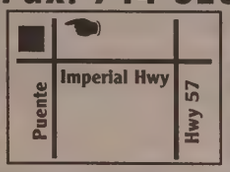

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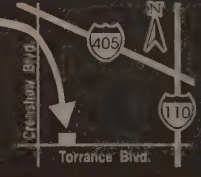

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- VLB Graphics Card w/1MB
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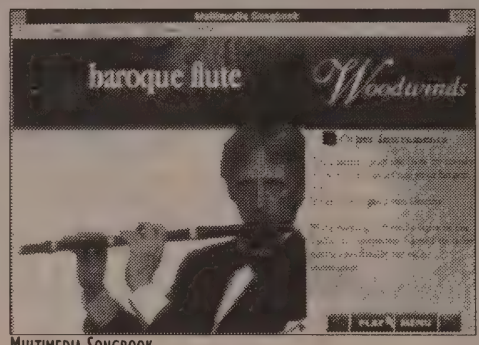

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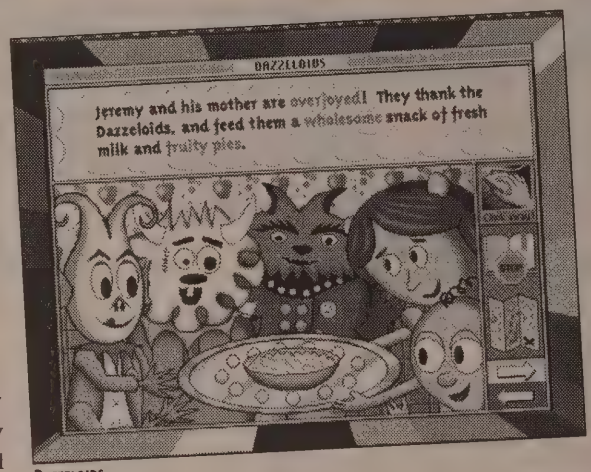
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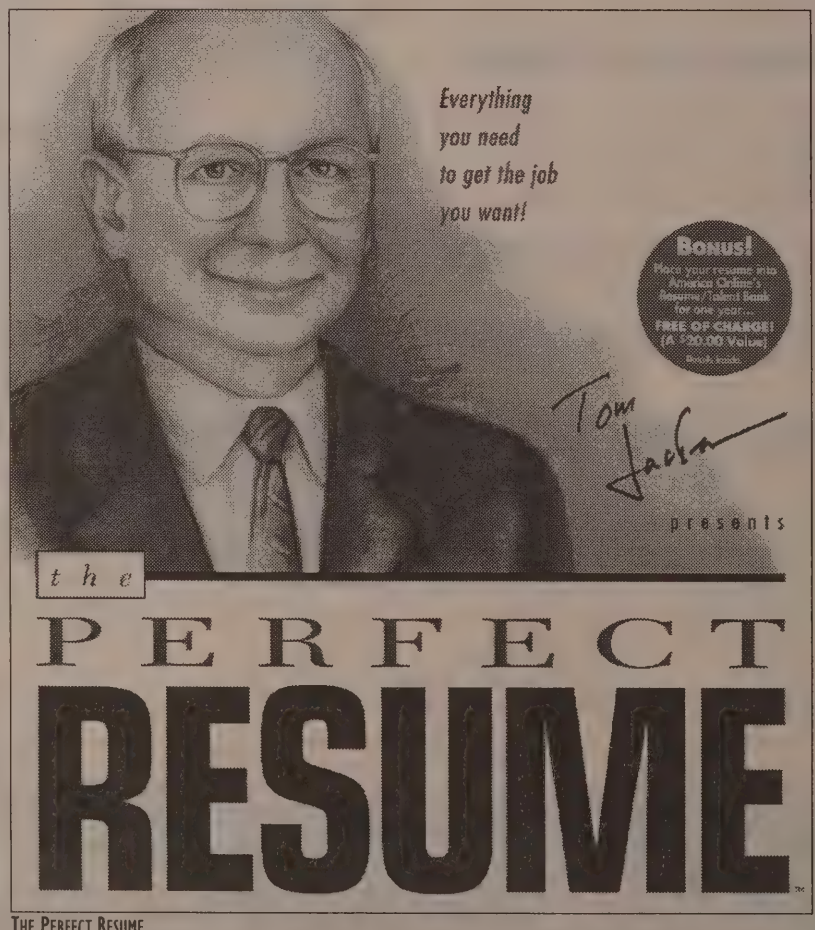

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continued on page 166

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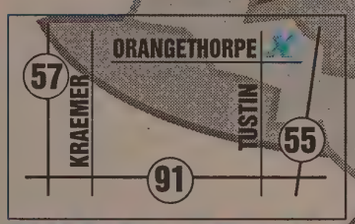

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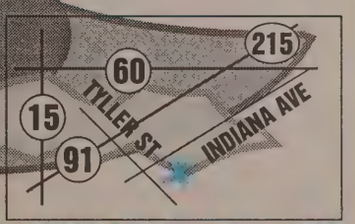

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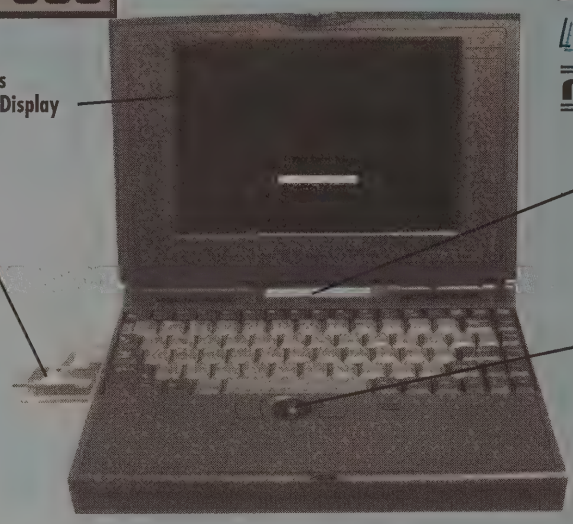

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- 10.3" Dual Scan DSTN 640x486 Simultaneous
- 9.5" Active Scan TST 640x486 Simultaneous
- 32-bit VLB w/1MB VRAM Windows Accelerator
- NiMH Rechargeable up to 4.5hr Quick-Charge
- Weight: 6.3lbs Size: 10.9"W x 8.58"Dx1.75"H
- Accessories for: Docking Station, External Battery Charger, Automobile Car Cable

Option

4Mb RAM Card	$219
8Mb RAM Card	$469
16Mb RAM Card	CALL
Car Adapter	$65

Dual-Scan Color SoundBook

486SX-33 with 260Mb HDD	$1999
DX2-50 with 340Mb HDD	$2199
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DX4-75 with 340Mb HDD & 12Mb of RAM	$2799
DX4-100 with 520 Mb HDD & 12Mb of RAM	$2999
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Monochrome Book

486SX-33 with 260Mb HDD	$1495
DX2-50 with 340Mb HDD & 8Mb of RAM	$1799
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*Mono Model Does Not Have Sound Chip Built-In

TROGON

- 4Mb RAM,120(200)Mb HD
- 1.44Mb Floppy Drive
- 9.5" Mono LCD Passive 640 x 480, 64 gray
- Build-in Trackball Mouse
- 1 Serial, Parallel, Mouse, VGA, Keyboard Port
- 83-key keyboard
- Lightweight: 5.5lbs
- Demensions: 8.7" x 11.1" x

NOVACO

- 486 SLC/2-50 Mhz
- 4Mb RAM
- 1.44Mb Floppy Drive
- 120Mb Hard Disk (200)
- 2 PCMCIA Slot
- 9.5" Mono LCD Passive
- Trackball mouse
- 83 Keys Keyboard
- Weight: 5.7 lbs
- Dimension: 11" x 8.5" x 1.75

CD-ROM DR Ext

The CD revolution is here! A external CD-ROM drive that plugs into your parallel port a you great performance. Supp ECP and standard parallel por

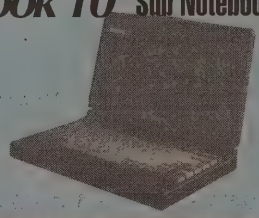
Canon Notejet & Notejet 2

- 486SX-33/486SLC2-50 MHz
- 4MB Up to 12MB
- 1.44MB Floppy Drive
- 130MB Hard Disk (190MB Option)
- Bubble Jet Printer Built-In
- Automatic Sheet Feeder Built-In
- PCMCIA - 2 Type II
- 10" LCD VGA Screen
- Canon 2-Button Hand Hold Trackball
- MS DOS 6.0, WINDOWS 3.1
- 7.7 Lbs. w/Bubble Jet Printer Inside
- One Year Road Side Service

NoteJet	MONO	DSTN
486SX-33 4/120	$1577	$2029
486SX-33 4/200	$1940	$2471
NoteJet 2	**MONO**	**DSTN**
486SLC2-50 4/130	N/A	$2174
486SLC2-50 4/260	N/A	$2598

Canon Book 10 Sub Notebook

- Intel 486SL/33 MHz
- 4MB Up to 20MB RAM
- 512K VRAM
- Ext. 3.5" 1.44MB Floppy Drive
- 170MB Hard Disk (120 or 260MB)
- 8.5"/7.8" Mono/Du-Scan Display
- 1S, 1P, 1VGA, 1KB Port
- PCMCIA Type II Slot
- Bulit -in Track Ball Mouse
- NiCad Battery(Mono), NiMH Battery (Du-Scan)
- Universal AC/DC Adapter 110~240V
- Weight Only 4lbs.
- Size: 11.3"x7.2"x1.5"
- DOS V6.21, Windows V3.11
- One Year Road Side Service



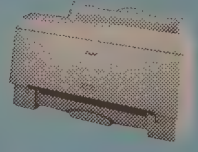
BOOK 10/C	MONO	DSTN
486SX-33 4/170	$1295	$1669
486SX-33 4/260	$1395	$1769

PCMCIA SOLUTIO

14.4 FAX/MODEM
96/24 FAX/MODEM
ETHERNET COMBO
2MB FLASH CARD
4MB FLASH CARD
SCSI

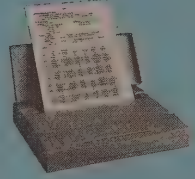
Canon

Bubble Jet
BJC-600 color
360 x 360 dpi
$479



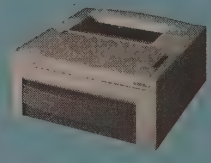
Bubble Jet
BJ-200e
360 x 360 dpi
256 Gray Scale
$229

Bubble Jet
BJC-4000 color
720 x 360 dpi
$398



BJ-10sx
- 110 Characters/Sec
- Laser-Like Printer
- 2-Year Warranty

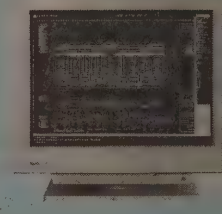
$239



LBP-430
Same as HP 4L
- 22 Fonts (8 Scalable)
- 1Mb up to 5Mb
- 2 Year Warranty

$555

NANAO



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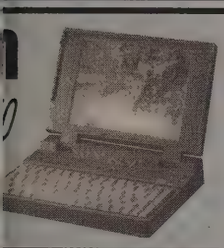

M	120MB	200MB
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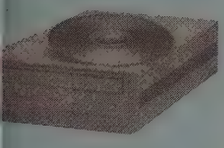

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PENTIUM PCI

- Intel Pentium CPU 60/66/90 Mhz
- 256K Cache up to 512K
- 8MB RAM up to 128MB
- 1.2 & 1.44MB Floppy Drives
- 425MB Hard Drive
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- PCI SVGA Card w/2MB
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- Double Speed CD-ROM
- Sound Blaster 16-bit MCD Sound Card
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- 14.4 Fax Modem
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- 101 Enhanced Keyboard
- Serial Mouse w/Pad
- Mid Tower Case w/230w PS

90Mhz... $2390

66Mhz... $2135

60Mhz... $2035

486DX2 VLB 66

Multimedia

- 486 DX2-66 Mhz CPU
- 256K Cache, 2 Local Bus/7 ISA Slots
- 4MB RAM up to 32MB
- 1.2 & 1.44MB Floppy Drives
- 425MB Hard Drive
- VESA Local Bus IDE/FDD Controller w/2S, 1P
- VESA Local Bus SVGA Card w/1MB
- 14" SVGA NI Monitor .28 Dot
- Double Speed CD-ROM
- 16-bit Stereo Sound Card w/2 Speakers
- 101 Enhanced Keyboard
- Serial Mouse w/Pad
- Mid Tower Case w/230w PS

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486DX2 VLB 66

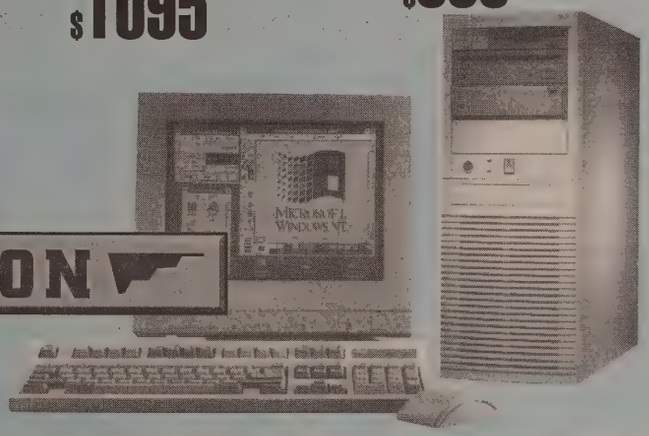
- 486 DX2-66 Mhz CPU
- 256K Cache, 2 Local Bus/7 ISA Slots
- 4MB RAM up to 32MB
- 1.2 & 1.44MB Floppy Drives
- 425MB Hard Drive
- VESA Local Bus IDE/FDD Controller w/2S, 1P
- VESA Local Bus SVGA Card w/1MB
- 14" SVGA NI Monitor .28 Dot
- 101 Enhanced Keyboard
- Serial Mouse w/Pad
- Mid Tower Case w/230w PS

$1095

386DX 40

- 386 DX-40 Mhz CPU
- 256K Cache, 8 ISA Slots
- 4MB RAM up to 32MB
- 1.2 & 1.44MB Floppy Drives
- 250MB Hard Drive
- IDE/FDD Controller w/2S, 1P
- SVGA Card w/1MB
- 14" SVGA NI Monitor .28 Dot
- 101 Enhanced Keyboard
- Serial Mouse w/Pad
- Mini Tower Case w/230w PS

$850



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	$ 65
	$145
	$145
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Oi-W	$3150
Oi-W	$1958
Oi-W	$1225
nitron	
'20	$1899
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- 1280 x 1024/.26mm (N.I.)
- 1024 x 768 at 75Hz Refresh
- MPR II Low Radiation
- Multi-sync EPA
- Invar Shadow Mask
- Flat Screen

$660

CM-17MBR

- 1280 x 1024/.28mm (N.I.)
- 1024 x 768 at 75Hz Refresh
- Digital Control
- Multi-sync
- Dynamic Focus
- Flat Screen

$599

CM-15VBR

- 1024 x 768/.28mm (N.I.) at 75Hz Refresh
- Digital Control
- Low Emission
- EPA,Flat
- Speaker Built-in

$345

CM-14UAE

- 1024 x 768/.28mm (N.I.) at 60Hz Refresh
- Low Emission
- EPA

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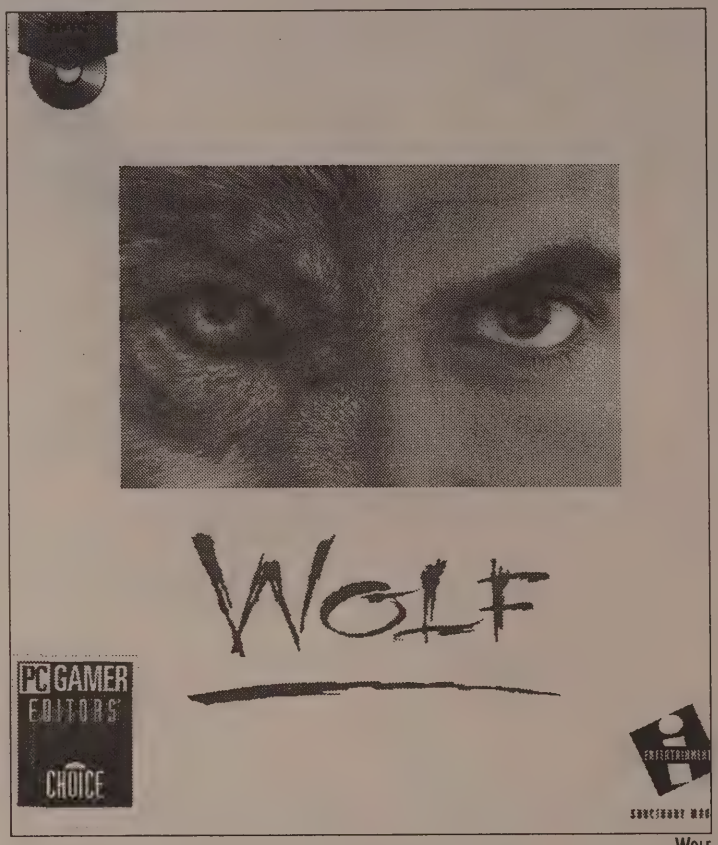
Product Spotlight continued from page 162

Designers, illustrators, multimedia developers, and corporate communicators can easily incorporate any of the CD's one hundred images into their work to create highly stylized graphics, fonts, and presentations, as well as illustrations and 3-D objects. These images were created by commercial photographer and FotoSets founder Robin Ginsberg especially for this Photo CD collection. The images on Art Textures and Backgrounds are royalty-free and are licensed for unlimited use in advertising, presentations, and publications. ($249 introductory price through December 31, 1994. Regular suggested list price, $349) PhotoSets, 4104 24th St., San Francisco, CA 94114. 1-800-577-1215.



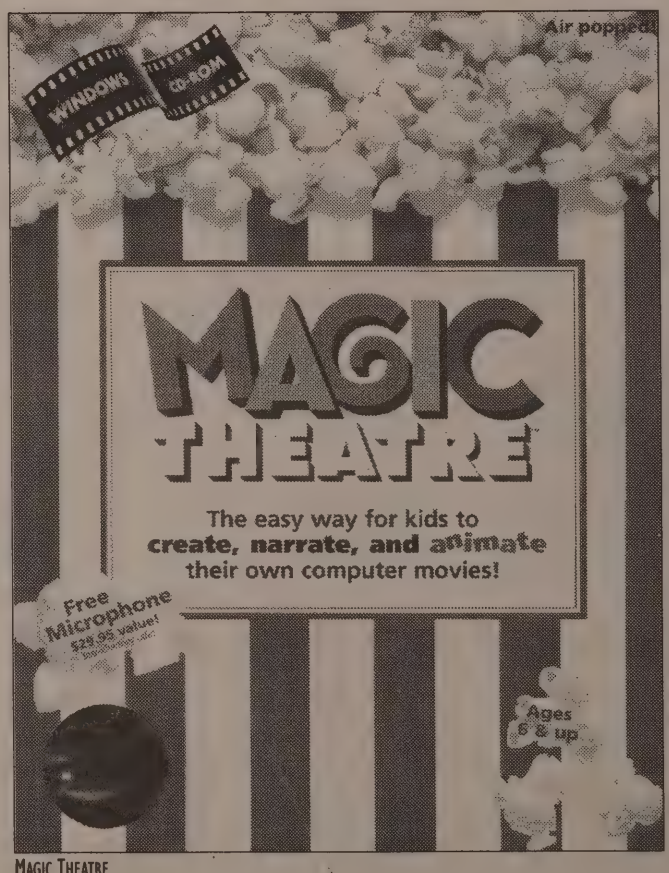
WOLF

THUMBELINA

Thumbelina's Giant Book of Adventures is a CD-ROM for both PC and Macintosh based on the new animated motion picture, *Hans Christian Andersen's Thumbelina*. It allows children to interact with the characters, imagery, and songs from the movie by coloring, reading, singing along, and counting. They can also find out about the making of Thumbelina with a behind-the-scenes look at the art of cell animation. ($39.95) Time Warner Interactive Group, 2210 W. Olive Ave., Burbank, CA 91506. 1-800-482-7366.

RISE OF THE ROBOTS

Rise of the Robots is a robot fighting game that features three-dimensional photo-realistic robots with complex artificial intelligence tables that allow them to learn and anticipate their opponents' strategies and adapt their defense accordingly. The user plays a cyborg who has been sent into a military and industrial robot manufacturing plant that has been taken over by a super-intelligent, liquid metal morphing robot infected with a menacing ego virus. For one or two players, on CD-ROM or floppies for PC. ($49.95) Time Warner Interactive Group, 2210 W. Olive Ave., Burbank, CA 91506. 1-800-482-7366.



MAGIC THEATRE

RESCUE THE SCIENTISTS

The Rescue the Scientists CD-ROM (for DOS) leads kids on a chase through time and space while teaching historical and scientific facts. Players must travel through time to find scientists who have been kidnapped by aliens and had their memories erased to prevent their important discoveries from being made, then gather enough artifacts to remind them who they are and what they have accomplished. The game consists of a mix of arcade sequences and problem-solving puzzle games like jigsaws, word searches, and card games. ($49.95) Compton's NewMedia, 2320 Camino Vida Roble, Carlsbad, CA 92009. (619)929-2500.

HUMAN CALCULATOR

The Human Calculator is a fully animated CD-ROM (for DOS) that features creative math strategies and action-packed math games from Scott Flansburg, the "Human Calculator" himself. It uses nontraditional methods to teach addition, subtraction, multiplication, and division through adventures with "Cal," an animated calculator. In addition to math lessons, tests, and games, The Human Calculator also teaches "Cool Tricks," such as how to calculate cube roots instantly in your head and figure out the day of the week of any date in the past, present, or future. ($39.95) Compton's NewMedia, 2320 Camino Vida Roble, Carlsbad, CA 92009. (619)929-2500.

FLASH TRAFFIC

Flash Traffic: City of Angels, by Tsunami Media and Time Warner Interactive for DOS CD-ROM, is an all-video interactive techno-thriller with over 120 minutes of full-screen, full-motion video. As FBI Special Agent in Charge, the player must lead his/her interrogation and assault teams in tracking down and stopping sinister international terrorists plotting to detonate a nuclear device hidden in Los Angeles in twenty-four hours. The interactive feature film includes multiple evolving story lines that are

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270MB	LPS270A	12ms	3.5"X1"	..... $189
540MB	LPS540AT	12ms	3.5"X1"	..... $239

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540MB	LPS540S	12ms	3.5"X1"	$259	$359
540MB	EMP540S	9.5ms	3.5"X1"	$499	$629
1.0GB	EMP1080S	9.5ms	3.5"X1"	$559	$659
1.4GB	EMP1400S	8.9ms	3.5"	$829	$929
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345MB	7345A	14ms	3.5"X1"	..... $189
505MB	7405A	14ms	3.5"X1"	..... $199
540MB	MXT540A	8.5ms	3.5"X1"	..... $239

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345MB	7345S	14ms	3.5"X1"	$239	$359
540MB	MXT-540S	8.5ms	3.5"X1"	$349	$459

CONNER

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540MB	CFA540A	12ms	3.5"X1"	..... $269
810MB	CFA810A	12ms	3.5"X1"	..... $429
1.08GB	CFA1080A	9.5ms	3.5"X1"	..... $559

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				Internal	External
340MB	CP30340S	xxx	3.5"X1"	$229	$329
540MB	CP30540	12ms	3.5"X1"	$299	$399
1.0GB	CPF1060S	<10ms	3.5"X1"	$589	$689
1.0GB	CPF1060W	<10ms	3.5"X1"	$799	$1035

WESTERN DIGITAL

IDE HARD DRIVES

340MB	WD2340	12ms	3.5"X1"	..... $199
420MB	WD2420	13ms	3.5"X1"	..... $209
540MB	WD2540	13ms	3.5"X1"	..... $269
700MB	WD2700	10ms	3.5"X1"	..... $349
1.0GB	WD31000A	10ms	3.5"X1"	..... $469

digital

SCSI-II HARD DRIVES

					Internal	External
1.0GB	3107L	9ms	3.5"X1"	$699		$799
1.6GB	3160S	9.5ms	3.5"	$899		$999

FUJITSU

IDE HARD DRIVES

530MB	M2684TAU	12ms	3.5"X1"	..... $299

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					Internal	External
340MB	M2637SA	11ms	3.5"		$349	$N/A
530MB	M2684SA	State of the Art			$299	$399
1.0GB	M2694ESA	10ms	3.5"		$579	$679

HEWLETT PACKARD

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					Internal	External
1.05GB	HPC3323A	10.5ms	3.5"X1"	$679		$779
2.1GB	HPC2490	8.9ms	3.5"	$1199		$1299

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1.05GB	MC4110A	8.5ms	3.5"	..... $579
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					Internal	External
1.0GB	MC4110AV	Audio	Visual		$669	$779
1.0GB	MC4110	8.5ms	3.5"X1"		$559	$659
1.75GB	MC2217	10ms	3.5"		$869	$979
1.75GB	MC2217AV	Audio	Visual		$1049	$1149
1.75GB	MC2217DW	Fast Wide Differential			$1299	$N/A
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3.0GB	MC1936	11ms	FH		$1799	$1899
3.0GB	MC1936AV	Audio/Visual			$1899	$1999
4.0GB	MC3243S	8.5ms	3.5"X1"		$2179	$2329
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209MB	ST9235AG	16ms	2.5"Notebook ..	$339
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540MB	ST9655AG	15MS	2.5"Notebook ..	$529
210MB	ST3243A	16ms	3.5"X1"	..... $189
341MB	ST3391A	13ms	3.5"X1"	..... $249
545MB	ST3655A	12ms	3.5"X1"	..... $399

SCSI HARD DRIVES

					Internal	External
456MB	ST3550N	12ms	3.5"X1"	$339		$449
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1.7GB	ST12450W	8MS	WIDE	$1559		$1849
2.1GB	ST12400N	9ms	3.5"	$1059		$1169
2.1GB	**ST12550N**	**8ms**	**3.5"**	**$1199**		**$1299**
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2.9GB	ST43401N	10ms	5.25	$2099		$2299
4.1GB	ST15150N	8ms	3.5"	$2399		$2499
4.1GB	ST15150W	8ms	3.5"	$2699		$2949
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IBM

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527MB	IBM527AT	12ms	3.5"X1"	..... $279
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2.0GB	IBM	8.6ms	3.5"	$1099		$1229
2.0WIDE	IBM	WIDE	3.5"	$1399		$1659
4.0GB	IBM	<10ms	5.25	$2199		$2399

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FLOPPY DRIVES

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affected by the decisions made by the player. ($39.95) Time Warner Interactive Group, 2210 W. Olive Ave., Burbank, CA 91506. 1-800-482-7366.

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Using data from the 1995 edition of the *Popular Mechanics New Car and Truck Buyers Guide*, this CD-ROM provides consumers everything they need to make an informed car purchase at the best price. Car buyers can view color photos and video footage of their dream car in action, compare and contrast vehicles, estimate car payments and yearly gas expenses, minimize research time, and learn negotiating tips. The Guide contains specific information on more than eight hundred new vehicles, including dealer prices for the vehicle and all options. ($30, for Windows 3.1) Books That Work, Inc., 2300 Geng Rd., Bldg. 3, Suite 100, Palo Alto, CA 94303. (415)843-4400.

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Paint Artist CD Edition is a personal creativity package that allows users to design their own greeting cards, posters, signs, banners, business stationery, business cards, and more. The CD Edition has all the features of the disk-based version, with the addition of a graphics search engine, calendars, and crafts projects capabilities; a coloring book feature; over twenty-three hundred clip art images; one hundred fonts; and a bonus CD with an additional four thousand graphics and three hundred fonts. ($59.95 for Windows) Maxis Corp., 2 Theatre Sq., Orinda, CA 94563-3346. (510)245-9700.

APPLE CD-ROM COLLECTION

In time for the holidays, Apple Computer has introduced eight CD-ROM title packs—each with three high-quality CD-ROMs plus Xpand Xpo, a virtual tradeshow on CD-ROM featuring demonstrations of all of the titles in the Apple CD-ROM Collection as well as information about ten thousand other Macintosh-related products. The Collection contains entertainment and education for every family member with topics ranging from a tour of the solar system to learning to count. Collection titles include: Smart Fun for Kids, Cool Fun for Kids, Adventures for Kids, CyberArcade, Holiday Selections, Sports and Humor, Encyclomedia, and Learning for Adults. ($43.50) Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014. 1-800-538-9696.

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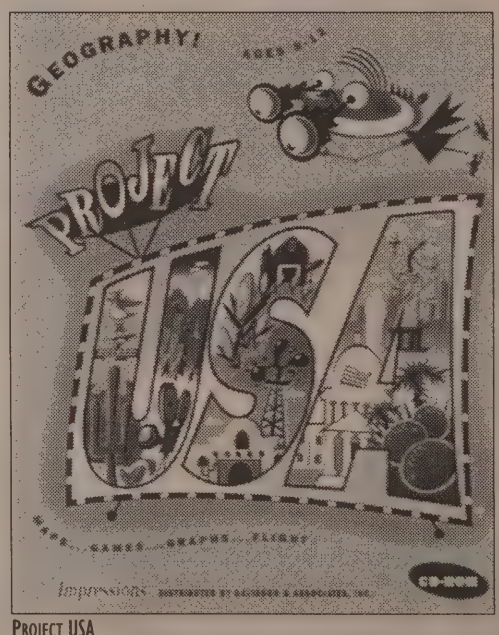

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Byron Preiss Multimedia has published a CD-ROM for Macintosh and MPC/Windows based on the works of Robert Crumb, the legendary underground cartoonist and creator of Mr. Natural, Fritz the Cat, and Keep on Truckin'. The R. Crumb Screensaver and Companion features twenty-five fully animated sequences to use as screensavers to personalize your computer screen; an electronic calendar customized with your own selection of cartoons; and a formmaker to output your own R. Crumb cartoon fax sheets, letterhead, and stationery. ($49.95) Byron Preiss Multimedia Company, Inc., 24 W. 25th St., New York, NY 10010. (212)989-6252.

RAYMOND CHANDLER LIBRARY

Trouble Is My Business: The Raymond Chandler Library is an MPC/Windows CD-ROM based on Raymond Chandler's Philip Marlowe novels and detective stories. The CD features the complete texts of Chandler's novels and stories, live-action clips from classic Hollywood movies, a video interview with a Chandler expert, voice-over narration, photographs, illustrations, and an animated map of 1940s Hollywood. ($49.95) Byron Preiss Multimedia Company, Inc., 24 W. 25th St., New York, NY 10010. (212)989-6252.

KURT VONNEGUT'S SLAUGHTERHOUSE-FIVE

Kurt Vonnegut's Slaughterhouse-Five: The Multimedia Experience CD-ROM lets the user travel with Billy Pilgrim, the novel's main character, as he is thrust through time. You are randomly taken through the events of the novel and have the chance to participate in the sound, sights, and action. The disc includes the complete edition of the novel, a video interview with Kurt Vonnegut, audio commentary, vintage photographs, illustrative drawings, and archival film footage of the historical events that shaped

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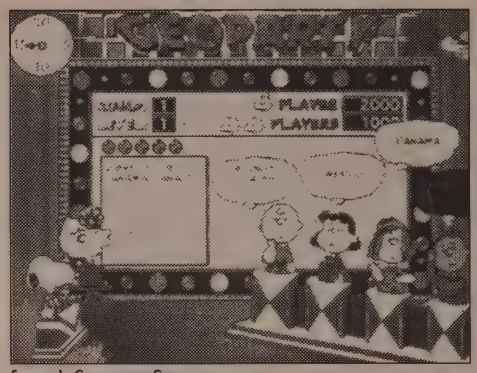
Product Spotlight *continued ...*

the novel. ($49.95, for MPC/Windows) Byron Preiss Multimedia Company, Inc., 24 W. 25th St., New York, NY 10010. (212)989-6252.



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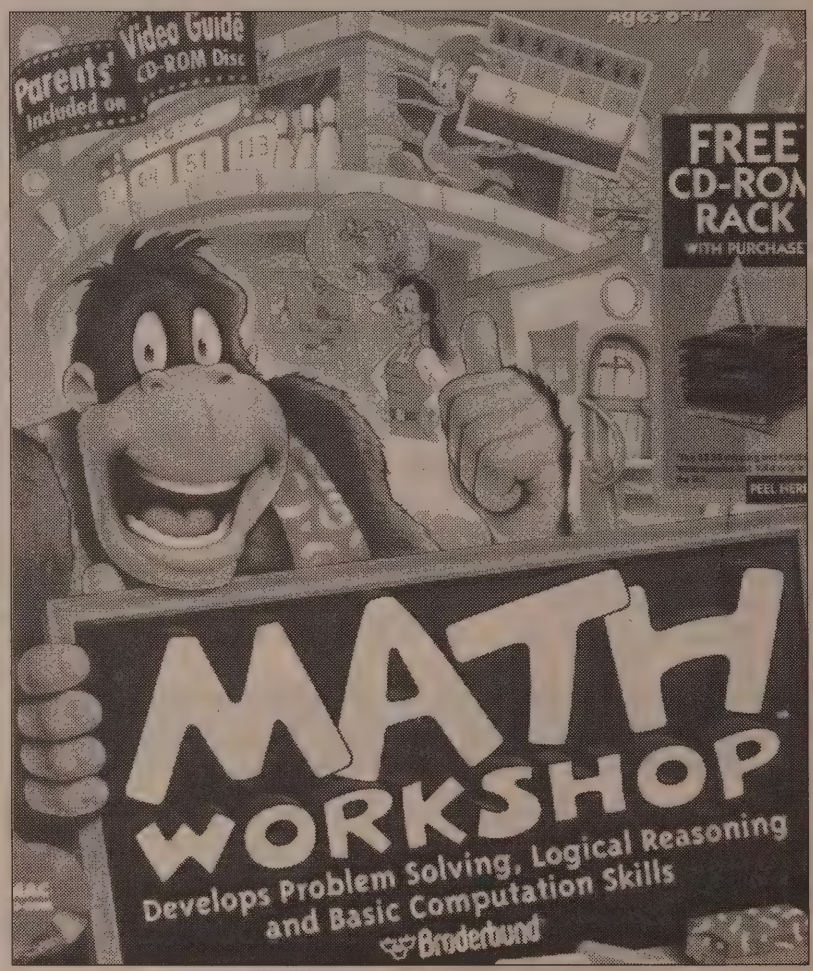
COUNTING ON FRANK

Designed to meet the standards of the National Council of Teachers of Mathematics, Counting on Frank builds curiosity in children ages eight to eleven about the role of math in the world around them. With a story line derived from a popular book by Australian author Rod Clement, this discovery-based learning program features an imaginative boy named Henry, his animated dog Frank, and his math companion Ginger. Together they embark on a series of adventures that help youngsters sharpen their basic math skills and discover math concepts in a fun way. Counting on Frank, offering three different levels, can be customized to meet the distinctive needs of learners at various levels of math skill development. It features an online calculator, an online notebook, and online help. ($39, for both Macintosh and PC) EA Kids, 1450 Fashion Island Blvd., San Mateo, CA 94404. (415)571-1717.



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ZURK'S RAINFOREST LAB

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Magic Theatre lets children easily turn their own stories and experiences into animated computer movies. Working under Windows, they can create original artwork by using multiple paint tools, some of which automatically mimic the styles of famous painters. They can also add animation, scenery, music, and visual effects from the extensive libraries provided. To develop their artistic skills, they can use the trace option, which lets them trace pictures as part of their sound recordings. Magic Theatre movies are automatically stored on your hard drive and can be copied to diskette to be shared with anyone owning a copy of the program. ($59.95, diskette or CD-ROM) Knowledge Adventure, Inc., 4502 Dyer St., La Crescenta, CA 91214. (818)542-4200.

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ATI Graphics Pro Turbo 2mb PCI	$419.00
ATI Graphics Pro Turbo 4mb VLB	$649.00
ATI Graphics Pro Turbo 4mb PCI	$659.00
Number-9 GXE64 1mb VLB	$209.00
Number-9 GXE64 1mb PCI	$209.00
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Video Cards (continued)

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Number-9 GXE64 Pro 2mb VLB	$399.00
Number-9 GXE64 Pro 2mb PCI	$399.00
Number-9 GXE64 Pro 4mb VLB	$579.00
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Hercules Stingray 1mb VLB	$149.00
Hercules Stingray 1mb PCI	$149.00
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Diamond Viper w/Corel 2mb VLB	$379.00
Diamond Viper w/Corel 4mb VLB	$539.00
Diamond Viper w/Corel 2mb PCI	$389.00
Diamond Viper w/Corel 4mb PCI	$529.00

Monitors

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Shamrock 15" Full / Flat / Dig. 28 NI	$379.00
Shamrock 17" Full / Flat / Dig. 28 NI	$749.00
Mag DX15F Full / Flat .28 NI	$389.00
Mag DX17F Full / Flat .26 NI	$689.00
Mag MX15F Full / Flat / Dig.28 NI	$469.00
Mag MX17F Full / Flat / Dig.26 NI	$899.00
Mag MX21F Full / Flat / Dig.28 NI	$1799.00
Nanao F340IW 15" .28dp NI	$659.00
Nanao F550IW 17" .28dp NI	$959.00
Nanao F760IW 21" .28dp Ni	$1899.00
Nanao T2.20 20" Trinitron NI (New)	$1969.00
Viewsonic 15E Flat .28 NI -351	$389.00
Viewsonic 15EX Flat .28 NI, MRPII	$429.00
Viewsonic 15G Flat .28 NI, MRPII	$449.00
Viewsonic 17 Flat .27 NI, MRPII	$949.00
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Viewsonic 17G Flat .28 NI, MRPII	$849.00
Viewsonic 20 Rnd. 28 NI	$1589.00
Viewsonic 21 Flat .25 NI	$1739.00
Daytek 15" .28dp NI MPRII, Dig.	$369.00
Daytek 17" .28dp NI MPRII, Dig.	$659.00

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DBS-Full Tower, UL 250Watt PS	$109.00
DBS-Super Tower, UL 250Watt PS	$129.00
DBS-Full Tower, UL 300Watt PS	$169.00
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DBS-Slimline Desktop, UL 250Watt	$89.00
DBS-Full Desktop, UL 250Watt	$89.00
Generic Mini Tower, 200Watt	$49.00
Generic Medium Tower, 230Watt	$69.00
Generic Full Tower, 250Watt	$79.00

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Microsoft Ergonomic Mouse, Bus	$89.00
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DBS - Mouse Pad	$5.00

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Calcom 14.4 External F/M	$109.00
Calcom 28.8 Internal F/M	$149.00
Magnum 14.4 Internal F/M	$99.00
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Sony CDU55E, 2x, 250ms, 342kb, IDE	$149.00
Mitsumi FX001-D, 2x, 250ms, 300kb	$159.00
Teac CD55A 4x, 195ms, 600kb	$299.00
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Toshiba XM3501-B, 4x, 155ms, 600kb	$399.00
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Disctec Roadrunner Express CD-2x	$379.00
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Ethernet Hubs	
3Com LinkBuilder TP/12	$359.00
3com Linkbuilder TP/12 W/Repeater	$379.00
Accton TP/12 port with Repeater	$299.00

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Colorado Powertape Int. 1.1gb SCSI	$679.00
Colorado Powertape Int 2gb SCSI	$1039.00
Colorado Powertape Int. 4gb SCSI	$1249.00
Colorado Trakker Ext-Par. 250mb	$369.00
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Conner Tapestor Int 1.36gb SCSI	$999.00
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Conner Python 2gb Ext SCSI	$1089.00
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Conner Python 4-8gb Ext SCSI	$1129.00
Conner Anaconda 1.35gb SCSI	$879.00
Conner Anaconda 1.35gb SCSI	$1049.00
Mountain FS7500 Int 525mb W/SCSI Cntr	$1169.00
Mountain FS7100 Int 1gb W/SCSI Cntr	$1279.00
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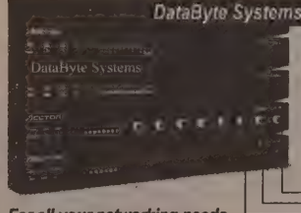

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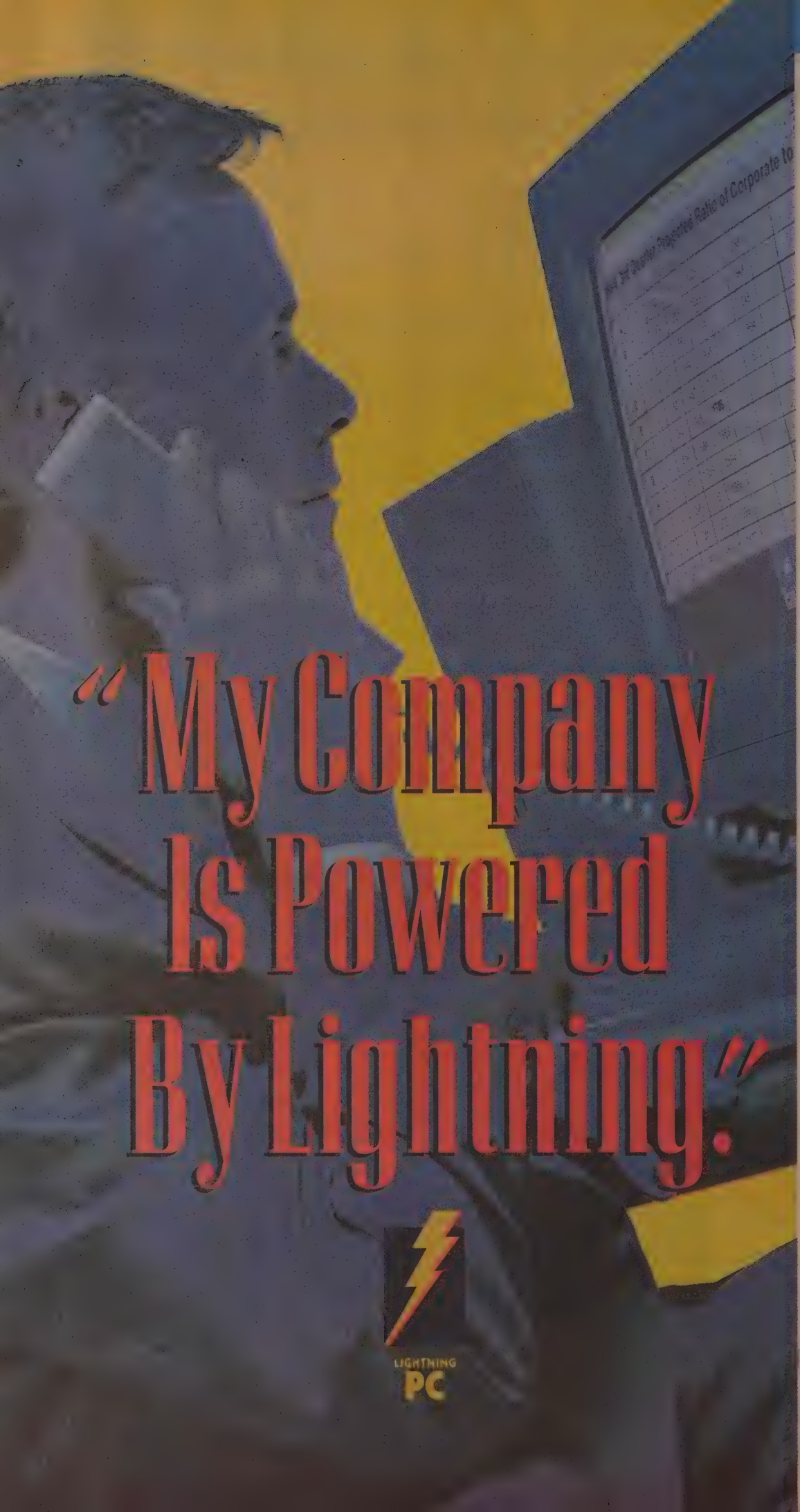

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PC Computing Best 200 — Comtrade Professional 66, June, 1994

CBG & H Best Buy — Comtrade Dream Machine, Best Buy 1993

PC World Best Buy — Comtrade VLB Best Buy, January, 1994

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Product Spotlight continued from 170

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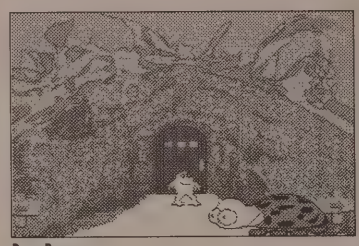
Rick Ribbit: Adventures in Early Learning invites you and your children (ages two to six) to visit and explore the neighborhood. Working in a nonviolent, nonthreatening entertainment environment, children choose which activities to perform and control the pace, while learning school preparedness skills. Six different learning activities teach skills of 1) shape, number, letter, and color recognition; 2) understanding directional works; 3) English phonetics; 4) set identification; 5) counting one to nine objects, and; 6) alphabetic ordering. Activities may be performed in one of five languages—English, French, German, Italian, and Spanish. ($29.95, Windows CD-ROM) Tadpole Productions, 13100 Worldgate Dr., Suite 250, Herndon, VA 22070. (703)471-7453.

CROSSWORD WIZARD AND IDEA WIZARD

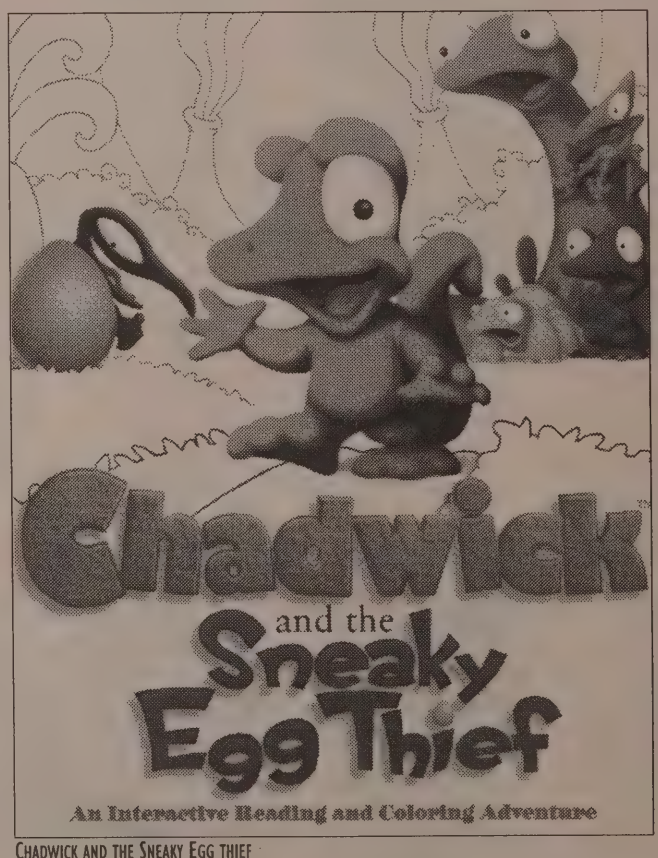

RICK RIBBIT

ALDUS ART EXPLORER

Art Explorer for the Macintosh, designed for children ages nine to fourteen, is a painting and drawing program with tons of cool art, including hundreds of exceptionally high quality, fun, and unique images—background scenes, stamps, stencils, and zany characters. It lets you mix and match graphic elements, stamps, and characters from different Art Worlds to design original creations. Other features include Color Itz and Build Itz to build and color cool images; a simplified, artistic-designed interface, with colorful icons and fun sounds; artist tools like charcoal, airbrush, markers, calligraphy pens, and more. While encouraging artistic experimentation, Art Explorer offers a fun, educational way to learn painting and drawing on the computer. ($49.99) Aldus Corp., 5120 Shoreham Pl., San Diego, CA 92122-5926. (619)270-2545.

CHADWICK AND THE SNEAKY EGG THIEF

KnowWare introduces its Colortoons series with Chadwick and the Sneaky Egg Thief, a Windows- launchable, DOS-based program. This program is a 20-page interactive reading and coloring adventure to promote reading skills, build vocabulary, and encourage creativity for children ages three to eight. It features a young dinosaur, Chadwick, and his companions who tromp, sail, and soar in search of the missing egg. The screens can be colored and decorated using a set of simple but powerful tools to create a vivid, colorful, individualized cartoon adventure. Phrases are highlighted as the story is read. Click on any word to hear it pronounced; click on anything in the picture to see and hear its name. Chadwick features the voice of June Foray, whose voice is known from such classic cartoons as *The Rocky and Bulwinkle Show* and *The Flintstones*. ($49.95) KnowWare Corp., 2450 Peralta Blvd., Suite 201, Fremont, CA 94536. (510)796-9132.



CHADWICK AND THE SNEAKY EGG THIEF

WOLF

Wolf is part survival adventure game and part simulation. Players act out the role of a timber, arctic, or plains wolf to experience the animal's environment and lifestyle. The sights, sounds, and even smells of the wolf's ecosystem are realized in this new game through animation, digital video footage, music, and sound effects. Throughout their quest to survive, players deal with a range of natural elements, from weather to hunters to lack of food. As in nature, your wolf becomes stronger, smarter, and faster as time elapses and you gain valuable experience as a predator. Available in both MS-DOS floppy and CD-ROM format. The CD version includes additional video material and a complete stereo CD audio soundtrack that can be played in any standard audio CD player. ($49.95) Sanctuary Woods, Inc., 1825 S. Grant St., Suite 410, San Mateo, CA 94402. (415)578-6340.

WORDSTUFF

Created for children ages three to six, WordStuff is a highly animated interactive picture dictionary in English and Spanish that gives pre-readers a head start on vocabulary and reading. Children learn more than seven hundred essential nouns and verbs and practice early sentence-building while discovering wacky animations and crazy sounds; recording their own voices; and creating and printing their own words and sentence coloring books. Kids can explore each of the four action-packed environments in three different modes: I-SPY, I-PLAY, and I-SING. Each mode, playable in English or Spanish,

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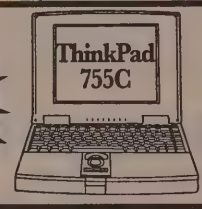

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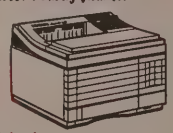

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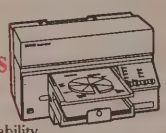

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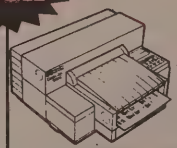

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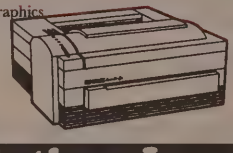

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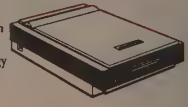

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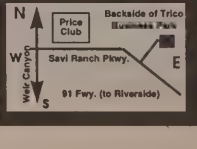

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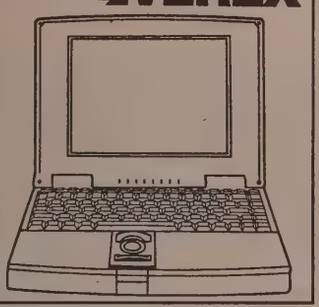

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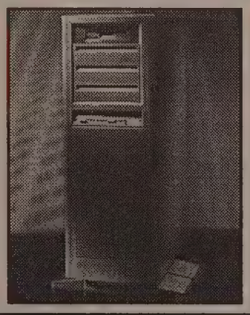

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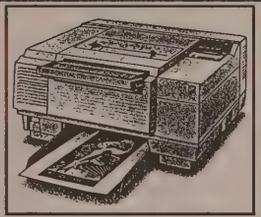

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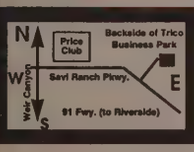

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Product Reviews

game reviews

SAM & MAX

Designed By: Sean Clark, Mike Stemmle, Steve Purcell, Collette Michaud
Published By: Lucasarts Entertainment Co.
For: IBM 386, DOS 5.0, 4MB RAM, CD-ROM, VGA, Adlib/SoundBlaster/PAS/MT-32/General MIDI
List Price: $54.99
Reviewed By: Fred Haslam

Sam & Max is a surprise and a delight, demonstrating the best possibilities of CD technology. This game has full-screen, quality animation with professional cartoon voices synched in. The adventure is so wonderful that I nominate it for Game of the Year (my second nomination for 1994).

This is an adventure game. Sam and his little buddy Max have been called in to locate a missing Bigfoot for the Kushman Brothers Carnival. Their adventures take them to the seven cheesy wonders of the world, including the largest ball of string and the celebrity vegetable farm. Using their own peculiar combination of wit and violence, our heroes manage to outsmart the evil country singer Conroy Bumpus and destroy a sizable chunk of western civilization.

The interface is mouse driven. It utilizes the standard tools of most adventure games, although the icons can be puzzling at first. The graphics are "cartoony," but excellent nonetheless. The animation is superb. Only digitized movies could be better. The music is understated, but the sound is marvelous. The real gem in this game are the character voices. *Do not buy this game unless you get the "full talky" version!*

Sam & Max is an imaginative adventure. You wander through a strange world defined by supermarket tabloids. A problem with this game is that you can't finish without the hint-book. Normally, I would be wroth—but this adventure is so delightful that I am willing to overlook this one liability. (Lucasarts Entertainment Co., PO Box 10307, San Rafael, CA 94912. 1-800-STAR-WARS)

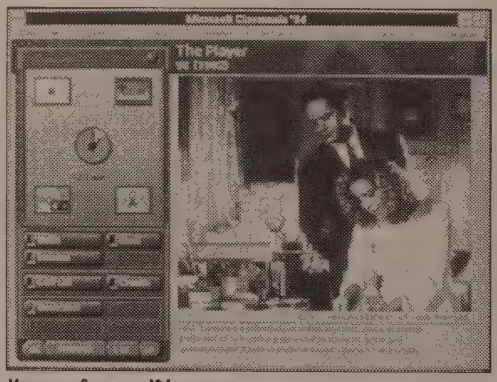
THEME PARK

Designed By: Bullfrog Productions Ltd.
Published By: Electronic Arts
For: IBM 386, DOS 5.0, 4MB RAM, VGA, CD-ROM, mouse, Sound Blaster/Adlib/ProAdio/Roland/WaveBlaster
List Price: $49.99
Reviewed By: Fred Haslam

Theme Park is a wonderful, engaging, engrossing, entertaining game. The interface can drive you nuts, but in this case there is enough of a reward to forgive the transgression.

SAM & MAX

THEME PARK


MICROSOFT CINEMANIA '94

In this British import, you build an amusement park. Much like other construction games, you lay down facilities and infrastructure. In this case, facilities are theaters, mazes, and rides of various sorts; while infrastructure is paths, bathrooms, and concession stands. Your twin goals are to make your patrons happy and to fleece them of cash.

The really cool thing about Theme Park is the patrons. You can see the little people running around the park, getting onto rides, and buying food and toys. And every single person is a simulation! They are all making choices about which path to follow, and what they want to do next. They often display little thought balloons to show you what they are thinking.

The interface is average, somewhat confusing and quirky. The graphics are decent and imaginative. There are a variety of high-quality 3-D rendered animations attached to the various rides. The music is good—a different theme for each ride. The sound is excellent! They have captured the sounds of an amusement park, giving you the feel of being on the spot.

Theme Park is a construction game. You have a budget to balance as you build your park. You compete with other parks for patrons, trying to score in six categories (excitement, safety, etc.). The game is engrossing and challenging—I recommend it highly. (Electronic Arts, Inc., PO Box 7578, San Mateo, CA 94403-7578. 415/572-2787)

macintosh software reviews

MICROSOFT CINEMANIA '94

Published By: Microsoft Corp.
List Price: $64.95
Reviewed By: Matthew Leeds

Cinemania '94 is a CD-ROM-based movie guide. Drawing on movie reviews by Leonard Maltin, Roger Ebert, Pauline Kael, and the *Encyclopedia of Film*, it covers over twenty-two thousand reviews, almost four thousand movie personalities, and has over two thousand stills of actors, directors, and others. It also has more than nine hundred movie stills, video scenes from twenty of the best movies of all time, and theme music and dialog from over two hundred films. The complete list of Academy Award winners and nominees is also provided.

The program contains an easy-to-use database that lets you quickly create lists of movies based on criteria you select. Want to see every film that Don Amiche performed in? All the films directed by Paul Newman? Just select them from the pop-up list in the appropriate category. Once your list is finished you can either save a copy or print it. I'd love to see a copy of Cinemania '94 running in every videotape rental store I frequent for those times I can't figure out what to see. (Microsoft Corp., One Microsoft Way, Redmond, WA 98052)

SCENERY ANIMATOR V1.1

Published By: Natural Graphics
List Price: $149
Reviewed By: Matthew Leeds

Did you ever have to make a 3-D map in school? Remember mixing flour, water, and food coloring to create mountains, lakes, and trees? Remember how it looked? It's much easier to use Scenery Animator. Scenery Animator is a 3-D landscape rendering and animation program. It uses three-

Product Reviews *continued...*

dimensional data from the US Geological Survey (or from a built-in fractal generator) to create realistic landscapes complete with trees, lakes, mountains, clouds, and shorelines.

The program provides complete control over camera position, angle, and elevation; snow and water level; lighting; colors; and trees. Digital data for landscapes covering portions of the Grand Canyon, Yosemite, Oahu, Mt. St. Helens, and the Moon are included, and other landscape data can be purchased.

In addition to rendering still images of landscapes, you can lay out a flight path through a landscape and create QuickTime movies of your flight. Controls for straight and curved flights including banked turns make setting up a path easy. The entire interface is well thought out and simple to use. The first version of the program was released for the Amiga in 1991, but this Mac version has been rebuilt from the ground up. Support for 68040 or Power Macs is provided, including '040 versions with and without FPU support.

New features in this version include support for export of DXF and color map files, and import and export of grayscale PICT files to allow you to edit landscapes in a paint program then reimport for rendering. Each gray level is interpreted as an elevation. This is a very cool program, and lots of fun to play with. (Natural Graphics, c/o Brett Casebolt, 4603 Slate Ct., Rocklin, CA 95677)

TYPESTRY 2 AND SHOWPLACE 2.1 CD

Published By: Pixar
List Price: Typestry 2, $299; Showplace 2.1 CD, $395
Reviewed By; Matthew Leeds

Pixar has a great reputation for producing quality 3-D products. Typestry and Showplace each offer unique features, use the excellent RenderMan rendering engine, and have recently been upgraded. Typestry lets you create 3-D rendered text easily and with great results; Showplace handles 3-D objects including text.

Typestry 2 takes the original version and improves on it. You can now use Type 1 or TrueType fonts as well as Illustrator files. Starting with these, you can add 3-D effects such as bevels and tube edges that can be edited and saved for future use. You have control over up to nineteen lights with variables such as position, color, intensity, shadows, and fog. There are a great variety of other effects including motion blur, shooting particles, projections and gels, warps, and perforations.

The results of your work can be output as a PICT, TIFF, EPS, RIB (for use in a Renderman environment), or as a QuickTime movie. Alpha channel support is included, and there is full control over the quality and resolution of images.

Just released is Typestry 2.1, which adds support for QuickDraw GX (in System 7.5) and Power Macintosh.

Showplace v2.0 is a marked improvement over the earlier version. As with v1, you can position existing 3-D objects in a scene, set camera angle and position, lighting, surface appearance, and render the results.

One of the major changes in v2.0 is the addition

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Product Reviews *continued...*

of Showplace plug-ins. These essentially are object generators, letting you create an object that can be modified. Pixar provides a plug-in development kit as well for users with a programming background. This version also will import DXF and Illustrator files.

Another major change is the inclusion of Glimpse, a Look editor. Looks are descriptions of the surface appearance of an object. You can either edit existing Looks to create new ones or import PICT or TIFF files to create texture-mapped Looks.

Finally, Showplace includes a three-station license for NetRenderMan Mac, letting you spread the rendering load across other Macs on a network. There is also a copy of NetRenderMan for offloading the rendering load to a UNIX machine. (Pixar, Inc., 1001 W. Cutting Blvd., Richmond, CA 94804. 510/236-4000)

pc software reviews

CLICKBOOK V1.1

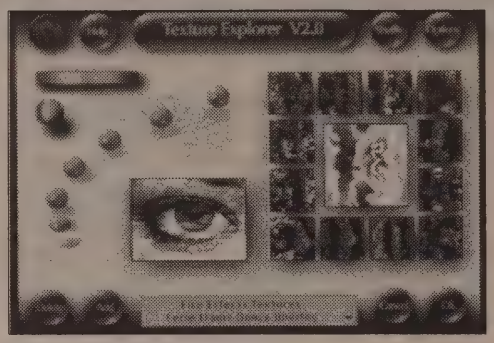
Published By: BookMaker
List Price: $69.95
Reviewed By: Woody Liswood

There are only a few programs which I feel are absolute necessities for the modern Windows-based office. Clickbook from Bookmaker is one of those.

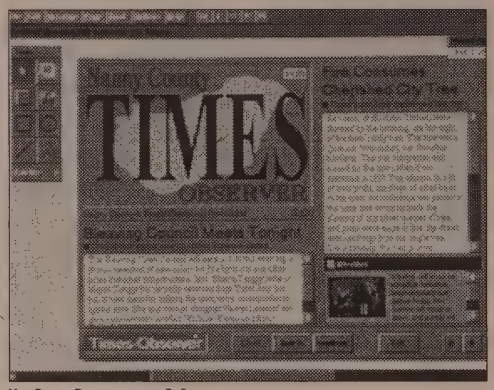
This tiny little program turns your printer into a massive publisher. With just a mouse click or two you can take a group of pages from your favorite word processor and turn it into the four-page double-sided booklet you need.

This great program is really a money saver. Since Clickbook does all the work, your printer will only need to charge you for printing, collating, and maybe even binding. Clickbook takes care of your layouts and page numbering so that the booklet is delivered as camera-ready copy.

I use Clickbook to print a 70-page Employee Handbook. The original is in AmiPro. Each year I update it and distribute the current version to all our employees. The editing and changes are normal word processing chores. The printing, now, is also a simple chore. When I'm ready, I just select Clickbook as my printer. When I print, the clickbook menu lets me select a double-sided booklet on normal paper. Clickbook thinks for a minute, and prints all of the inside pages. It stops, instructs me to take the paper out of the printer, turn it around, and place the paper back into the printer before it prints the outside pages. This produces a foldable booklet, printed on both sides of the paper with everything in place. I check it out. Things look OK, so I print again, only this time I print the outside sheets on fresh paper. These camera-ready pages go the printer to make all the booklets I need.



KAI'S POWER TOOLS FOR WINDOWS V2.0



NEOBOOK PROFESSIONAL 2.0

I could not find any problems with Clickbook. However, you may need to do some experimenting along the way. Clickbook makes various assumptions about the text as it converts the word processor document into what it feels is the appropriate size and type for your booklet.

This is one of the most useful programs I've got for my Windows-based PC. I wouldn't set up a PC without it. (BookMaker, 2470 El Camino Real, Suite 108, Palo Alto, CA 94301. 415/354-8166)

KAI'S POWER TOOLS FOR WINDOWS V2.0

Published By: HSC Software
List Price: $199
Reviewed By: Pamela Mason

Even if you have absolutely no practical need for this program, you should buy it anyway, for the sheer fun of it! Where else can you apply neon glow worms or vortex tiling to an image? As most desktop publishers and graphic artists are well aware, this package is a serious tool for anyone who creates images, whether fine art or graphic. Because Kai's Power Tools (KPT) is an image *generator*, it offers the user the ability to explore infinite visual possibilities and combinations. KPT consists of thirty-three plug-in filters and extensions and runs from within host graphics programs with compatible architecture, such as Adobe Photoshop, Aldus Photostyler, Fractal Design Painter, Fauve Matisse, Corel Photopaint, Altamira Composer, and Micrografx Picture Publisher. Just in case you don't have one of these packages, the 2.0 version comes bundled with Aldus Photostyler Lite.

This version offers immediate realtime preview capabilities, improved speed performance, color enhancement with internal 48-bit color, and the ability to work directly in the CMYK color space. All the modules—the Gradient Designer, the Texture Explorer, and the Fractal Explorer—allow saving of "presets." These presets and the hundreds of supplied sample presets can be shared between the modules and applied to any image. There are many powerful transparency options such as alpha channel, and Photoshop's most powerful calculation commands such as Add, Subtract, Multiply, Screen, and Difference are now standard modes within KPT. The new Equalizer brings unprecedented control to the Texture Explorer. I reviewed this using a beta copy of Adobe Photoshop 3.0, and with its new multi-layering editing and alpha-channel capabilities this combination is a veritable image-processing feast!

This is the most innovative image processing package on the market—bar none. The feature that sets this program apart is the sophisticated user interface with its push-and-pull widgets that encourage experimentation. It lacks the standard clutter of text menus everywhere. The menus are there, but are "asleep" and only invoked when needed. John J. Wilczak, chairman and CEO, says, "KPT was meant to deliver something that very few products deliver, that being a sense of discovery within the creative process." It delivers. (HSC Software, 6303 Carpenteria Ave., Carpenteria, CA 93013. 805/566-6200)

NEOBOOK PROFESSIONAL 2.0

Published By: NeoSoft Corp.
List Price: Shareware, $89.95; retail, $99.95
Reviewed By: Pamela Mason

NeoBook Professional 2.0 is a DOS-based interactive multimedia authoring system. This package does not try to please all of the people all of the time. Rather, it has one focused goal: to ensure that the average computer user can create multimedia presentations that play on the PC, including older models. NeoBook's sleek design allows you to get right to work without the steep learning curve generally associated with authoring packages. I created a decent presentation, which included a flic, in several hours! The standalone .EXE files that you create can be distributed royalty-free.

NeoBook Pro's strength lies in its intuitive interface. Its minimalist design shows just how eloquent simplicity can be. You can quickly utilize its features and therefore spend your time designing a presentation rather than trying to figure out how to use the program. If you want to edit an image, a flic, or a text file, simply switch to your favorite word processing

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Product Reviews *continued...*

and image processing programs then jump back into NeoBook Pro to place them. The ability to run FLI and FLC flics attached to a button or from within a given window area on the screen was the most appealing feature of this program to me. The button maker for creating interactive buttons offers a drop-down menu of choices that you can then connect to the "hot" button. NeoBook Pro supports Sound Blaster's .VOC file format for sound, or it can access the PC's internal speaker for playing and editing SNG music files for use on older computers or computers that lack a sound board.

Because it is DOS based you have the drawback of not having direct TrueType font access. Fonts use the .GEM font file format renamed to .GFT. You could convert vector, or TrueType fonts to bitmapped fonts with an outside conversion utility though, and with a little extra effort have a wider variety of fonts than initially offered with the package. Three extra font disks that have about thirty fonts each are available for $10 each.

The bottom line: Don't let the low price fool you, this package is a real value. It offers both ease-of-use and features that many much more expensive packages lack. If you are just getting started in multimedia this is a great place to begin; if you already use a high-end package this one might surprise you.

Shareware and retail versions available. The retail version includes a Templates disk with formatting ideas for creating electronic publications. A Multimedia Pak is also available for $169.95 that includes NeoPaint (paint program), NeoShow 2.5 (slide show program), and NeoBook 2.0. (NeoSoft Corp., 354 NE Greenwood Ave., Suite 108, Bend, OR 97701-4631. 503/389-5489)

THE GREATEST PAPER AIRPLANES

Published By: Kitty Hawk Software
List Price: $39.95 (special price of $29.95 through December 31, 1994)
Reviewed By: Summer Yacco

Have you ever tried to see how many ways you could fold a paper airplane? That's what Kitty Hawk Software did, and they came up with twenty-five cool ways to throw a piece of paper. The Greatest Paper Airplanes not only shows you how to fold these airplanes, it offers plenty of tips and hints about how to launch and fly each one, too. At the same time it also teaches you the basics of aerodynamics, the history of flight, and terminology.

People of all ages love folding paper airplanes, and with this program a smart three-year-old can do it. Paper Airplanes gives you easy instructions, and shows each fold in sequence. The advance button lets you zoom in and out, rotate the view, and position it anywhere on the screen. You can even stop in the middle of a step to see exactly what's happening. Another feature lets you skip the regular stops along the way.

If you have problems making folds properly, you

PIXEL 3D PROFESSIONAL V2.0

can use a template. The product includes a pad with a different plane, including dotted fold lines, on each page. There are two pages for each airplane, and if you run out, you can print your own.

You might wonder if new paper airplane designs could fly as well as the common type. Rest assured, the designs in the Greatest Paper Airplanes, from the Hammerhead to the Kingfisher, all fly well. You'll have hours of fun with the Greatest Paper Airplanes. (Kitty Hawk Software, Inc., PO Box 94189. Tuscon, AZ 85728. 1-800-777-5745 or 602/622-2200)

amiga software reviews

PEGGER 2.0

Published By: Heifner Communications, Inc
List Price: Limited Time Offer $49.95; Regularly, $99.95; Upgrade $15
Reviewed By: Douglas J. Nakakihara

Pegger is a utility for the Amiga that allows any program to use JPEG compressed files. Basically, Pegger quietly sits in the background until a program tries to load or save an image file. At that point it automatically translates to or from JPEG and one of thirteen different file formats, including IFF24, VideoToaster framestore, DCTV 3 and 4 (filtered and non-filtered), HAM8, Impulse RGB8, IFF8, IFF8 grayscale, Targa, JPEG grayscale, and Toaster CG. The calling program never knows the difference. It can also be used to batch process a directory of files.

Although the JPEG compression is adjustable, the default setting of 85 lets you store VideoToaster framestores using over 90% less filespace! Darker images may require a higher setting, but you'll still probably end up with files 75% smaller.

The coolest new feature is "snoop by program." In the previous version you had to specify specific directories which Pegger should operate on when any program loaded or saved an image file. Now you can specify by program, so images will be processed no matter where they are stored. This means that multiple programs that require different file formats can use the same JPEG files. For example, an application can read JPEG images in the Toaster Framestore directory as IFF24 files.

Pegger now works across networks, including Parnet and AmigaLink. Processing speed has also been significantly increased. If you work with the VideoToaster or just 24-bit images, Pegger is nothing less than a must-have utility! (Heifner Communications, Inc., 4451 I-70 Dr. NW, Columbia, MO 65202. 1-800-445-6164)

PIXEL 3D PROFESSIONAL V2

Published By: Axiom Software
List Price: $299.95
Reviewed By: Douglas J. Nakakihara

Pixel 3D Professional v2 is a 3-D object utility program for the Amiga. Because PixelPro can load and save objects in many different formats, it is great when used only as a conversion program. Bitmapped fonts and images (with adjustable smoothing), as well as PostScript fonts and EPS files can also be loaded, so it is great for "flying" logo work.

Several surface and point editing functions are probably duplicated in whatever 3-D modeler program you are using. However, there are some incredibly handy tools to automatically merge polygons and reduce vertices, using user-defined tolerance levels. Proper use of these tools will reduce rendering times with little or no visual difference. Automatic beveling is also featured with customizable "router bits."

Surface naming, editing, and coloring is also featured. I particularly liked the ability to choose a polygon and find out its surface name. Multiple objects can be loaded and PixelPro allows you to manipulate object hierarchies. Objects can be viewed using various levels of detail and camera angles, making PixelPro handy for quickly viewing objects in something more than wireframe.

PixelPro's look and feel is very much like LightWave 3D, so many users will feel right at home. The concept of "chosen" and "selected" takes a while to understand, but on the whole it is a fairly easy program to learn. ARexx is supported with a full command set and the program will take advantage of AGA chipset. This would be a solid addition to anyone's 3-D tool arsenal. (Axiom Software, Inc., 1526 122nd St., Burnsville, MN 55337. 612/894-0596)

cd-rom reviews

SYNDESIS 3D-ROM VOLUMES I & II

Published By: Syndesis Corp.
List Price: $99.95 each
Reviewed By: Douglas J. Nakakihara

Syndesis has put together a collection of over five hundred 3-D objects (Volume I) and another with over two hundred (Volume II). Every object comes in LightWave, Imagine, AutoCAD, 3D Studio, and Wavefront formats (including some scene files).

continued on page 186

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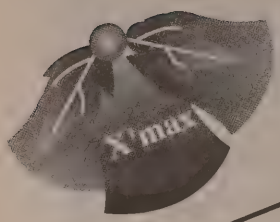

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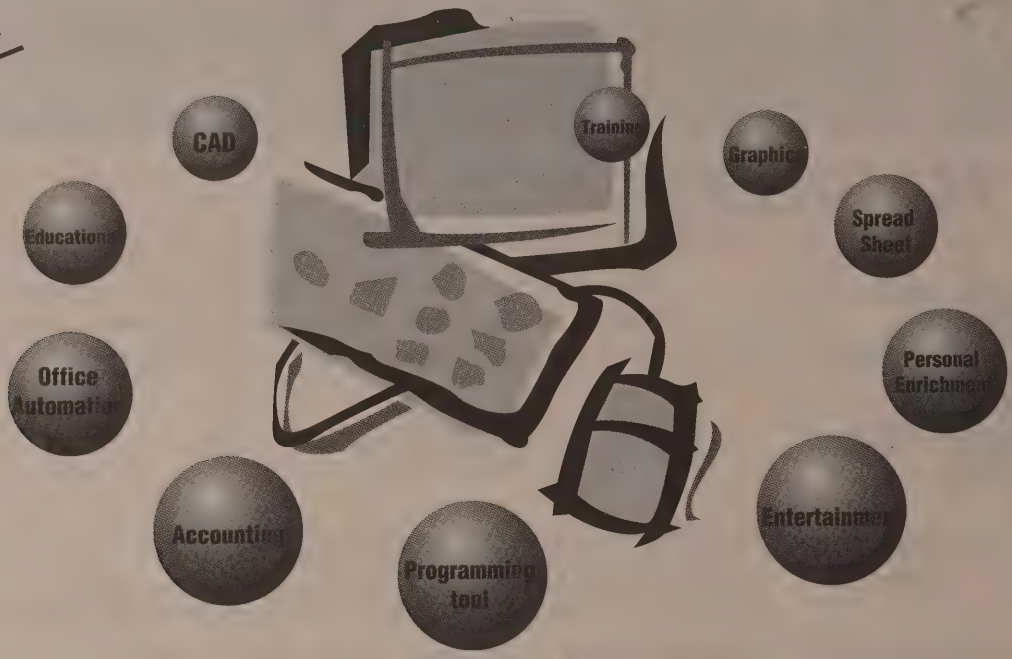

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Product Reviews continued from page 182

Volume I also includes more than four hundred tileable TIFF, GIF, and IFF24 images. These ISO9660 CDs are compatible with virtually any computer platform.

The bulk of the objects were gathered from PD sources or contributed by the artists. However, several detailed objects are from commercial modeling companies. As a result, the quality of objects varies widely and usability will depend on your needs. Using LightWave, I found a few objects had minor extraneous polygons, unusual pivot point locations, and incorrectly facing polygons. You may also have to eliminate non-planar polygons. Fortunately, these small nuisances are very easy to correct.

The best feature is the manual's object and texture picture catalog, which provides thumbnail examples. There is also a detailed index and file listing. The only gripe I have is that the filename used in the printed pictures was not always used to sort the file listing, so it sometimes took some searching to find the actual file location.

It is important to note that Syndesis is not a 3-D object vendor, rather these CDs demonstrate their 3-D object file format translation system called InterChange. Still, these CDs offer a great addition to any 3-D artist's object library and are reasonably priced. (Syndesis Corp., 235 S. Main St., Jefferson, WI 53549. 414/674-5200)

SYNDESIS AVALON CD

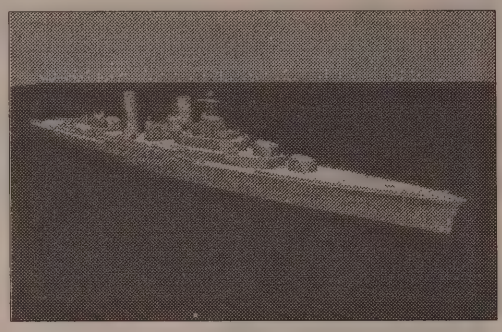
Published By: Syndesis Corp.
List Price: $49.95 each
Reviewed By: Douglas J. Nakakihara

Syndesis Avalon CD-ROM gives you a snapshot of the avalon.chinalake.navy.mil Internet site as of July 18, 1994. (If you aren't familiar with Internet sites, it's just like looking at a hard drive with many files and directories.) There are tons of 3-D objects, bitmap texture maps, informational text files, utilities, etc. in various different formats. This ISO9660 CD is compatible with virtually any computer platform.

You'll need an arsenal of decompression programs (particularly one that can handle .z files) to use most of the files. Also, because of CD-ROM filename standards you may have to refer to the manual for the original UNIX filename to determine the compression method used. An object format translation program, like Syndesis's InterChange or Axiom's PixelPro, would also be very helpful, as would a program to translate bitmap image formats. There are some limited translation utilities included, but they are platform specific.

Unfortunately, in a departure from their 3D-ROM series, there are no printed pictures of any of the image or object files. As such you'll have to depend of the index descriptions and filenames for reference unless you want to resort to a file-by-file analysis. However, the files are reasonably grouped by type, format, category, etc. Moreover, this disc is half the price of Syndesis' 3D-ROM volumes, which are bargains in themselves.

SYNDESIS 3D-ROM



SYNDESIS AVALON CD

For the price of some downloads you get fingertip access to a great Internet site. (Syndesis Corp., 235 S. Main St., Jefferson, WI 53549. 414/674-5200)

EASY KEYS 1.0

Published By: Blue Ribbon Soundworks LTD
List Price: $39.95
Reviewed By: Mark Will

If you have always wanted to try your hand at composing music but don't have an expensive keyboard, then EasyKeys from Blue Ribbon Soundworks LTD may be the CD you are looking for. It is advertised as having features that can be found on synthesizers costing hundreds of dollars and makes it easy to sound like a "pro" even if you've never touched a musical instrument. You get to decide how much of your own creativity you want to put into composing a given song. In case you discover that you are more musically inclined than you thought, or if you already know, you may want to investigate Blue Ribbon's SuperJam program. This program gives you more choices, has extensive MIDI support, and a demo is provided with EasyKeys.

The interface consists of a picture of a keyboard and is quite intuitive. After spending five minutes with the 30-page instruction manual I was easily able to create, record, and play back fairly complex sounding "songs" complete with sound effects. If you don't like manuals, the help system allows you to bring up a picture of the interface and click on the part you want more information on. One of the most interesting features allows you to assign any WAV file to one of the six "drum pads." While the program is excellent, there are some limitations. The program loads a little slowly and you really only get twenty-five keys to play a melody with (the leftmost twelve keys are chords).

The installation of the program is straightforward and will create a separate program group with ten icons in it. Many of these icons simply explain features more fully or help you understand the entire Blue Ribbon Soundworks product line.

The minimum system requirements include a 386SX or higher, CD-ROM, 2MB RAM, 3MB hard drive space, and a Windows 3.1 compatible sound card. (Blue Ribbon Soundworks LTD, PO Box 8689, Atlanta, GA 31106-9832. 1-800-226-0212)

MICROCOMPUTER ABSTRACTS ON CD-ROM

Published By: SilverPlatter Information
List Price: $495/yr.
Reviewed By: Matthew Leeds

SilverPlatter Information markets research and reference material indexed on CD-ROM. They cover a great number of technical, medical, economic, political, and engineering areas. Each CD uses their search engine, SPIRS. This allows a user of their products to become familiar with a single interface (and install a single engine).

Microcomputer Abstracts covers over seventy-five trade publications, magazines, and professional journals. The material includes references to computer software, hardware, networks, communications, databases, books, industry events, and company information. The abstracts date from 1989 forward, and an updated CD is produced each quarter.

The SPIRS install program provides simple access to the configuration options available. Full consideration has been given to the issues around multi-user and network usage. This makes SilverPlatter products suitable for library, corporate, and university environments.

SilverPlatter offers DOS and Windows versions of SPIRS. A demo CD with the Windows software, a subset of the AIDSLINE database, a DOS-based demo of the Windows software, documentation, and a directory of products are available for the asking directly from SilverPlatter. Their products are not fancy, but if you need the info they've got, they provide excellent indexing and retrieval software. (SilverPlatter Information, 100 River Ridge Dr., Norwood, MA 02062. 617/769-2599. Email: info@silverplatter.com)

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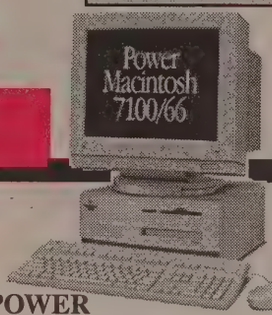

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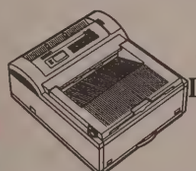

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communications hardware review

VOMAX 2000

Manufactured By: Macronix
List Price: $425
Reviewed By: Woody Liswood

Vomax, which I speculate stands for VOice—Modem—fAX, all by itself, answers your phone, determines if the call is a voice message, a modem with a file to send, or a fax. Whatever it is, the Vomax takes the information and stores it in internal RAM.

When you are at your computer, you can listen to messages by pressing a button on the Vomax. A set of LEDs tells you if you have mail or faxes. For a fax, you can use DOS- or Windows-based software to download the fax to your PC to view or print.

When you are on the road, the Vomax can be programmed to automatically forward your voice mail and faxes. After receiving the message or fax, the Vomax dials the phone number you programmed in. When it receives the correct password, it plays the voice mail or transmits the fax. If you don't know where you will be, no sweat. The Vomax can be reprogrammed over the telephone.

The 14,400 fax modem is Hayes compatible. I'd had no problems using it with Winfax Pro, Hyper Access for Windows, Procomm Plus for Windows, and Unicom. The Vomax comes with both modem and fax modem software.

If you have an office, and want to watch your expenses, this Vomax will pay for itself rather quickly because of reduced utility bills—you no longer need to leave your computer running twenty-four hours a day to receive a fax. Plus, if you are pressed for finding another slot for an internal fax modem the Vomax offers a solution. It uses a serial port. This is a great device. (Macronix, Inc., 1348 Ridder Park Dr., San Jose, CA 95131. 408/453-8088)

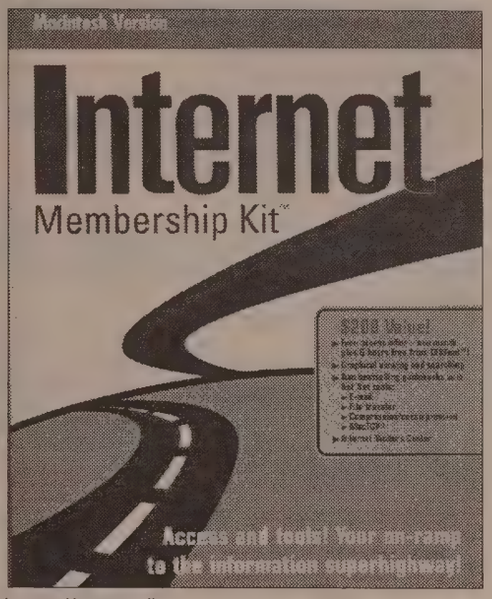
book reviews

INTERNET MEMBERSHIP KIT—MACINTOSH VERSION

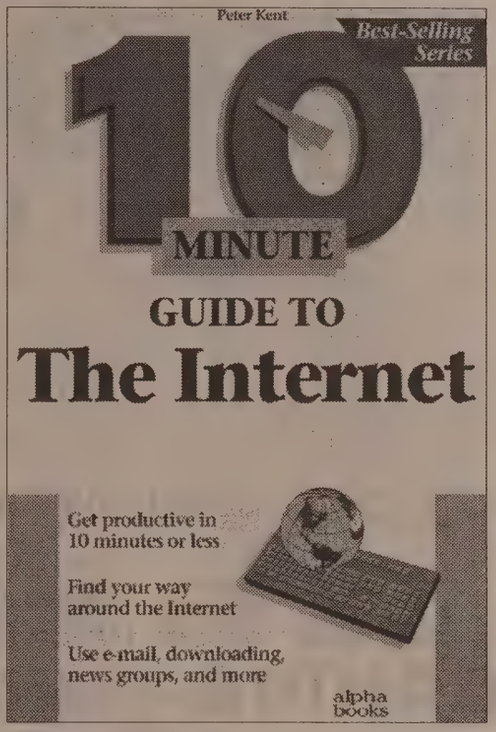
Published By: Ventana Press
List Price: $69.95 (Windows version also available)
Reviewed By: Michael Robin

Being "Directly On The Internet" is different than connecting to cyberspace through a dial-up account on CompuServe, America Online, The WELL, or even your local Internet provider. While each of these online services provides some level of access to the Internet—from simply exchanging email to accessing many of the resources available on the Internet—the actual connection is still somewhat limited.

In overly simplified terms, "directly on the Internet" means working from a computer that has a live, direct connection that lets you run—on your computer, not the host that you dial into—TCP/IP-based software. For most of us who are not associated with a research institution, university, or large corporation that has a dedicated, leased line to the net, this means establishing a SLIP (Serial Line Internet Protocol) or PPP (Point-to-Point Protocol) account with an Internet Service Provider (such as Netcom, Delphi, PSI, or CCnet).



INTERNET MEMBERSHIP KIT



10 MINUTE GUIDE TO THE INTERNET

The Internet Membership Kit, a book and software package, was created "to help you harness the Net by providing one-stop access and tools that conform to your Macintosh operating system." The book describes what the Internet is, what you can do on it, and how to use the resources and tools you will find there. More specifically, the *Kit* includes a *Read Me First* booklet; *A Brief Guide to Mosaic*; *The Mac Internet Tour Guide*, with a Companion Disk; and *The Internet Yellow Pages*.

The *Tour Guide* presents a brief history of the Internet, provides a general overview of Internet etiquette and usage, and how to use the basic Internet software tools, including email, FTP, gopher, and telnet. The *Yellow Pages* nicely complements this with a wealth of information about what is on the Internet and where to find it.

The Companion Disk includes shareware versions of InterSLIP, for establishing a SLIP connection; Eudora, for email; Fetch, for FTP; NCSA Telnet; Nuntius, a newsgroup reader; TurboGopher; and a licensed copy of MacTCP. There is also information on where and how to download a recent version of NCSA Mosaic, which lets users cruise the Web.

The software is configured for setting up an account with CERFnet. If you already have an account or prefer to use another service, you will need to ask them how to reconfigure MacTCP, InterSLIP, Eudora, and Nuntius. The settings, such as IP and gateway addresses, are specific to each Internet provider.

In the rush to help explain the Internet, there seems to be a new book published almost every month. The *Internet Membership Kit* is one of the very few that combines several books, each written to cover different aspects of the Net, with a suite of software to offer a complete package for the beginner as well as experienced user on the Net. (Ventana Press, Inc., PO Box 2468, Chapel Hill, NC 27515. 1-800-743-5369 or (919)942-0220)

10 MINUTE GUIDE TO THE INTERNET

Published By: Alpha Books
List Price: $12.99
Reviewed By: Kevin Savetz

If you could get productive on the Internet in a few ten-minute lessons, you would, right? That's the hook for the *10 Minute Guide to the Internet*, a terse introduction to what the Internet is, how to get online, and the basics of navigation. It is geared toward users accessing the net by dialing into a UNIX host, and is slanted toward individuals using Microsoft Windows on their home computers.

10 Minute Guide to the Internet does its job and covers the basics of using UNIX, electronic mail, FTP, archie, WAIS, WWW, gopher, telnet, and Usenet. It is divided into twenty "ten-minute" lessons. It is intended for the beginner, and the book does a fair job, considering its brevity.

The first edition certainly has its fair share of typographical errors, some in very unfortuate places. (For instance, the note on how to turn off call

continued on page 192

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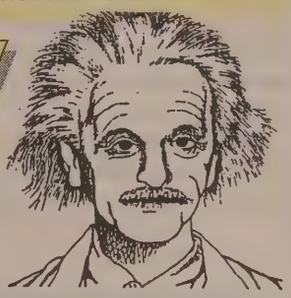

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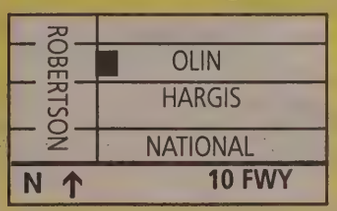

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Product Reviews *continued from page 189*

waiting is rendered useless by an errant numeral.)

A person who is already familiar with computers, Windows, and DOS might find this book a helpful tool in the struggle to master Internet basics. It is, however, too short to serve as a thorough introduction. (Alpha Books, 201 W. 103rd St., Indianapolis, IN 46290. 1-800-428-5331)

COOL MAC SOUNDS

Written By: Craig O'Donnell
Published By: Hayden Books
List Price: $24.95
Reviewed By: Kevin Savetz

If you need to stuff the stocking of someone who spends more time at the Mac tweaking the system's sounds than actually working, stuff that stocking with *Cool Mac Sounds.* It's a 300-ish page book brimming with information about making sound with the Macintosh.

Cool Mac Sounds starts with the basics of sound and how computerized sound works. It quickly moves on to the ins and outs of input and output using control panels, HyperCard, F-Keys, and standalone applications. It covers all the bases, such as digitized sound, MIDI, and recording sounds yourself.

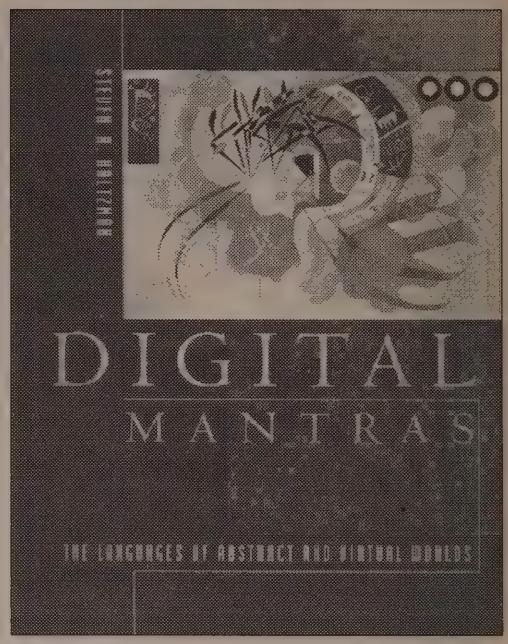
It also includes honest reviews of add-on sound equipment and software. The style is light and readable, although the author does get a bit too technical on occasion.

The book comes bundled with a floppy disk stuffed with audio files: sound utilities and lots of great digitized tracks. The programs and the book range from the useful to the utterly useless. *Cool Mac Sounds* is a winner—you'll be glad you heard about it. (Hayden Books, 201 W. 103rd. St., Indianapolis, IN 46290. 1-800-428-5331. Email: hayden@hayden.com)

DIGITAL MANTRAS

Written By: Steven R. Holtzman
Published By: The MIT Press
List Price: $29.95, companion music CD $16.95
Reviewed By: Pamela Mason

In *Digital Mantras—The Languages of Abstract and*



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Product Reviews *continued...*

Virtual Worlds, author Steven Holtzman presents the viewpoint that someday computers will be integrated into the creative process in such a way that they are capable of contributing unique and idiomatic themes of their own. One example is Harold Cohen's Aaron's code, in which Aaron, an artificial intelligence-based computer program, controls a robotic arm apparatus to create art in the form of paintings. Holtzman explores the historical evolution of structures across many disciplines: linguists, musicians, and artists; from the ancient Sanskrit linguists, through Gregorian chants, to linguistic scholar Noam Chomsky, and the purist perspective of Bahaus artist Wassily Kandinsky.

The author explains, "A structuralist view of languages provides the theoretical foundation for designing all of these systems. Such a view will be at the foundation of the virtual worlds of tomorrow. Virtual realities will consist of sounds, visual worlds, perhaps worlds of touch, smell, and taste. Each of these worlds will be created by computer engines driven by rule-governed languages, each with its own grammar."

What comes to mind for me as perfect examples today of his premise of computers as structure and symbol manipulators are Prusinkiewicz's L-grammar-based artificial plant life models and Karl Sim's stunning images that are created with artificial evolution algorithms using mutating symbolic LISP expressions.

Holtzman believes that a paradigm shift is necessary in the creative process itself. "It is probably not yet natural to think of expression in terms of abstract structures." He proposes that until rule-governed systems are used as creative tools, then the integration of computers with the creative process will not be complete.

This book offers a new perspective, a different voice in the digital evolution. With its academic, yet accesible approach, *Digital Mantras* will certainly invoke discussion and healthy controversy with its thought-provoking theories.

A companion music CD, created by the author, is also available. One composition on the CD is called "Machine Music ICL 2970" and is an example of idiomatic digital music derived directly from "listening" to the ICL 2970 mainframe's processor. (The MIT Press, 55 Hayward St., Cambridge, MA 02142-1399. 1-800-356-0343. Email: mitpress-orders@mit.edu)

THE HACKER AND THE ANTS

Written By: Rudy Rucker
Published By: Avon Books
List Price: $20
Reviewed By: Bill Gram-Reefer

Two virtual thumbs up for *The Hacker and the Ants*, Rudy Rucker's recent raucous romp through one possible Silicon Valley reality. Rated R, with adult situations, Birkenstocks, violence, and corporate manipulation of the little guy, Rucker twists together strands from cyberspace, robotics, nanotechnology, genetic engineering, hacking, high-tech hubris, and corporate sabotage into a tightly plotted and often funny misadventure.

Jerzy Rugby, an aging, soon-to-be divorced com-

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Product Reviews *continued...*

puter programmer for GoMotion, a fictional company that makes intelligent housekeeping robots, is a perfect patsy for Rucker. Rugby, accused of infecting the worldwide net of computers and television programming with an intelligent, self-replicating virus that appears as ants, loses wife, family, job, and almost his life as he tracks down the secret of the ants and the culprit that set him up for the fall.

Hacker is full of well-drawn characters and locales including the likes of Riscky Pharbeque, Studly the beta dog, and the Antland of Fnoor. Plus, Rucker's comic entrepreneurial valley setting—where everyone, rich or poor, native or immigrant, is just out to earn a buck anyway they can, like the real estate lady moonlighting as spy and talent agent—pulls the plot along despite Rugby's raging hormones, vulgarity, and officious sounding mysticism.

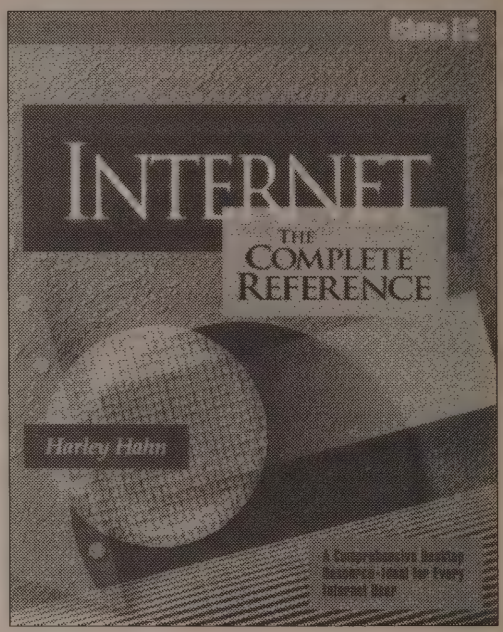
Breaking the mold, Rucker's geometrically correct if not completely original sketches of cyber-based groupware, virtual mall life, and dark dreams provide an interesting fix on how normal people in Santa Clara County might someday interact with an ubiquitous network. And because he refused to include a streetwise juvenile bike/skateboard messenger Rucker proves he's no slave to current cyberpunk literary fashion. (Avon Books, 1350 Avenue of the Americas, New York, NY 10019. 1-800-238-0658)

THE INTERNET COMPLETE REFERENCE

Authors: Harley Hahn and Rick Stout
Published By: Osborne/McGraw-Hill
List Price: $29.95
Reviewed By: Kevin Savetz

The Internet Complete Reference is a grassroots guide to learning about the Internet. It takes the clueless Internet newbie and leads him or her from the fundamentals—like understanding what the Internet is, how to connect, and how addressing works—through the Internet's most important tools: telnet, email, Usenet, FTP, gopher, WAIS, Internet Relay Chat, and so on. This book doesn't cover any ground that hasn't been trod dozens of

continued on page 199



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Product Reviews

continued from page 194

times before by other everything-you-need-to-know-about-the-Internet books, but it delivers the information in a lively, always interesting manner. No topics are glossed over—the authors do a fine job of explaining how to use software such as archie, rn, trn and tin newsreaders, electronic mail, FTP, and many others. Hahn and Stout never get mired in the dirty technical details, but they do explain what to do and how to avoid trouble.

The Internet Complete Reference is intended for folks who will be accessing the Internet using a UNIX command line prompt. If you will be using SLIP (Serial Line Internet Protocol) or PPP (Point-to-Point Protocol) or a VAX you will still find about half this book useful.

The book also includes a 150-page catalog of Internet resources (which for all the world looks like it was culled from another Hahn and Stout masterpiece, the *Internet Yellow Pages*), a useful listing of Internet service providers, and a list of Usenet discussion groups.

This review boils down to this: If you are just trying to get started on the Internet, but don't know which of fifty step-by-step books in your bookstore you should buy, *The Internet Complete Reference* won't disappoint you. (Osborne/McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710)

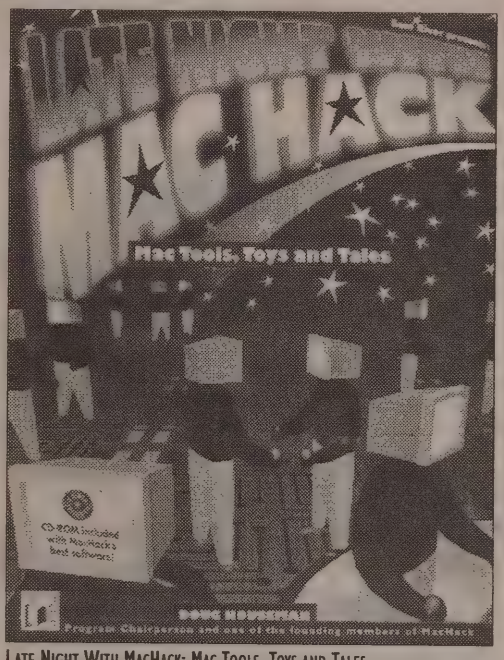
INTERNET STARTER KIT FOR MACINTOSH SECOND EDITION

Written By: Adam C. Engst
Published By: Hayden Books
List Price: $29.95
Reviewed By: Bill Gram-Reefer

If Infobahn and Autobahn are the same to you—someplace you'll never cruise along at breathtaking speed—then Adam C. Engst's update to his best-selling first edition will get you revved up and headed tire-screeching in the right direction toward the nearest on-ramp of the super-duper information highway. For once again Engst, editor of the popular online TidBITS, has delivered a truckload of concise and useful information within about one thousand pages, and included a high-density diskette with the (mostly) shareware software you'll need to hotwire your journey into cyberspace.

Like the first edition, the best part of this users' manual is the chapter on how to set up and run the licensed or shareware TCP-based Mac software that comes free on the diskette. This section also includes updated reviews and evaluations of top programs from the standards to the not-quite-there-yet concepts fresh from the skunk works. The FAQ (frequently asked questions) section on topics such as MacTCP, InterSLIP, and PPP will save you hours of headache. Also included are reports on online services, Mac BBS packages, and commercial software. The *Internet Starter Kit* also provides tips and tricks from the pros on mundane topics—like how to read a UUCP mail

INTERNET STARTER KIT



LATE NIGHT WITH MACHACK: MAC TOOLS, TOYS AND TALES

header—to truly inspired tinkering—like when a flamer goes on and on, just reply "you may be right!" Finally, the trunk is packed with *usable* appendices.

There is no upgrade path from the first edition. So if you have the first one, give it to a friend or the school's library, and get the new one for yourself. (Hayden Books, 201 W. 103rd. St., Indianapolis, IN 46290. 1-800-428-5331. Email: hayden@hayden.com)

LATE NIGHT WITH MACHACK: MAC TOOLS, TOYS AND TALES

Author: Doug Houseman
Published By: M&T Books
List Price: $29.95 (includes CD-ROM)
Reviewed By: Kevin Savetz

What happens when you shove a few dozen of the brightest hackers in a hotel for a few days; give them plenty of caffeine, computers, and electronic gadgetry; and tell them not to come out until they've done something interesting? The MacHack Conference. Each year, three hundred of the top Macintosh programmers meet for MacHack, an infamous gathering in which amazing things happen to the Macintosh computer.

Late Night With MacHack chronicles what happened at nine of these annual events of hackerdom. It does a fantastic job of showing us the culture of Mac hackers, the behind-the-scenes development of the Macintosh—and (best of all) the results of the work. This book tells of hundreds of fantastic tools and toys that have been developed at the MacHack conferences. Not only that, but it delivers most of the applications (many with source code) along with a look at the people who were at the events on one overstuffed CD-ROM. If you're a Mac person, you need this book.

The goodies in the book (and on the CD-ROM) range from the useful (programs to replace the Chooser and add hierarchical menus to System 7), the offbeat (such as instructions for controlling your computer via a TV remote control), and the downright weird (including the famous NetBunny and NetWarmer, a control panel for heating your coffee right from the Mac). There are also lots of nifty hacks for programmers as well as an explanation (but no source code) of software that makes the Macintosh operating system work on a Sega Genesis.

In addition to programs and source code, the CD-ROM contains 440MB of QuickTime movies. Most of these are from video taken at MacHack. Some are mundane walk-arounds at the event; others are hilarious excerpts from the awards ceremonies. (For example, one video clip is a demonstration of DylanTalk, a cool hack that would read the text of dialog boxes in the programmer's voice. This was a year or two before Apple included this type of capability as standard equipment on high-end Macs.) Other QuickTime movies include some Apple television commercials, cool rendered graphics, as well as clips of Dan Quayle making a fool of himself. I'm not too sure what that is doing there, but why not? From beginning to end, *Late Night With MacHack* conveys the essence of hacker ingenuity and fun. (M&T Books, a subsidiary of Henry Holt and Co., 115 W. 18th St., New York, NY 10011. 212/886-9200)

OS/2 2.11 UNLEASHED

Written By: David Moskowitz, David Kerr, et al.
Published By: SAMS Publishing
List Price: $39.95
Reviewed By: Lenny Bailes

If you're an OS/2 user and frustrated with IBM's sparse printed documentation, this book is for you. It is a huge compendium (more than twelve hun-

Product Reviews *continued...*

dred pages) of OS/2 tips, tricks, and secrets, assembled by an OS/2 maven who tells you all the things IBM left out of the manuals. The book covers installation options, how to set up an OS/2 maintenance partition, *all* of the system options in config.sys (and how to tweak them for maximum performance). The section on the Workplace Shell shows a number of neat tricks you can do with the settings options: for instance, display multiple mini-views of the desktop while an application is running full-screen. You'd never know that you can do this from reading IBM's online help. The book also includes extensive sections on managing DOS and Windows applications, setting up and administering networks, working with multimedia, finding and installing SVGA display drivers, printing and font management, and the OS/2 productivity applets.

OS/2 Unleashed includes a CD-ROM disk with over 600MB of OS/2 shareware: alternate command shells, system utilities, communications programs, graphics and screen capture, multimedia, word processors, and REXX utilities. The last chapter is a 100-page listing of worldwide BBS numbers with profiles of each system by sysop, primary focus, and author's comments on each. (SAMS Publishing, Inc., 201 W. 103rd St., Indianapolis, IN 46290)

THE INTERNET RESOURCE QUICK REFERENCE

Written By: William Tolhurst and Mary Anne Pike
Published By: Que
List Price: $17.99
Reviewed By: Kevin Savetz

The *Internet Resource Quick Reference* is any publisher's dream: collect a bunch of free resources from the Internet, write a few pages of introductory material, send it to press, and sell it for $18 a pop.

Perhaps that wouldn't be so nauseating if the information therein was difficult to obtain. This book, however, is intended for those who are already familiar with the basics of operating the Internet (it says so right in the three-page introduction). If you're already familiar with the Internet, this information is not difficult to obtain—in fact, it is some of the most readily available stuff out there.

With that in mind, what is in this book?

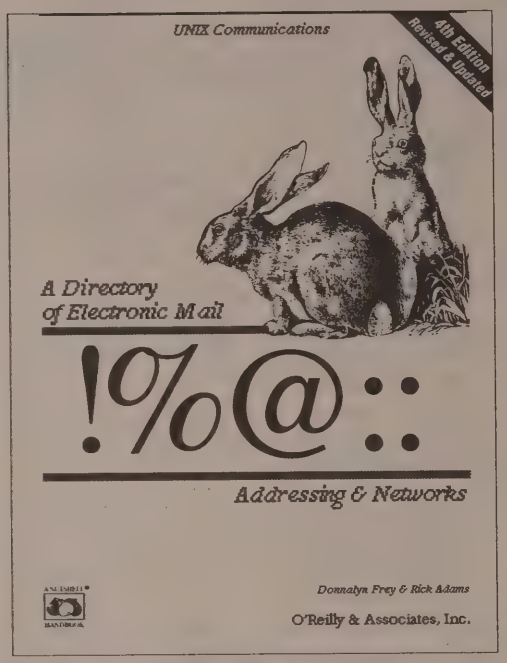
It starts with the Usenet newsgroup list. You can get this list via FTP at ftp.uu.net in /networking/news/config/newsgroups.Z . Your savings: $5.63.

Next up is the list of publicly accessible electronic mailing lists. You can get it via FTP from rtfm.mit.edu in /pub/usenet/news.answers/mail/mailing-lists or on the Usenet newsgroup news.lists . Your savings: $9.00.

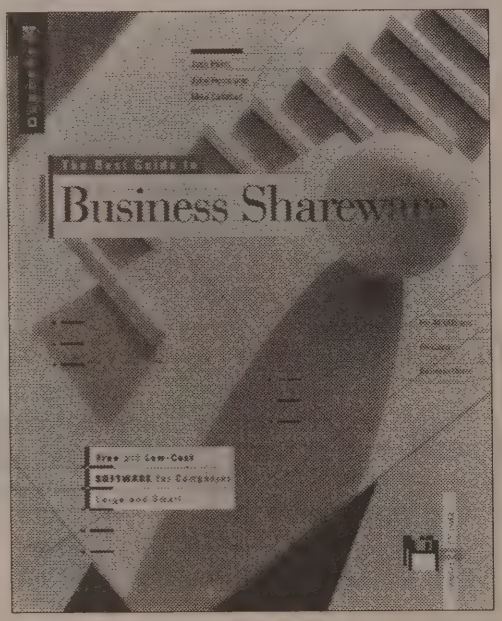
There's also the Special Internet Connections List, by Scott Yanoff. You can find out how to get that by fingering yanoff@csd4.csd.uwm.edu . You save: 70 cents.

And, there's the Inter-Network Mail Guide, also by Scott Yanoff. Also available via FTP at csd4.csd.uwm.edu in /pub/internetwork-mail-guide . Your savings: another 70 cents.

The only redeeming part of this book is the 46-page Host Resource Guide, a listing of a few good FTP sites, gopher sites, and special interest topics. This is the only thing that doesn't appear to have been filched from the Net, so I can't tell you where to get it for free. I will, however, save you that last $1.96 by pointing you to an even better online resource: John December's "internet-cmc" list, which you can get via FTP from ftp.rpi.edu in /pub/communications/internet-cmc.txt .



!%@:: A DIRECTORY OF ELECTRONIC MAIL ADDRESSING & NETWORKS



THE BEST GUIDE TO BUSINESS SHAREWARE

The information in *The Internet Resource Quick Reference* is certainly worth $18, no doubt about that. Anyone with an Internet connection can get it for nothing, though, so save your money. (Que Corp., 201 W. 3rd. St., Indianapolis, IN 46290. 1-800-428-5331)

!%@:: A DIRECTORY OF ELECTRONIC MAIL ADDRESSING AND NETWORKS, FOURTH EDITION

Written By: Donnalyn Frey & Rick Adams
Published By: O'Reilly & Associates
List Price: $9.95
Reviewed By: Kevin Savetz

This tome easily gets the award for best title of an Internet book. *!%@::* (which I pronounce bang-percent-at-colon-colon) is a reference book of information related to electronic mail.

It starts with a short (20-page) introduction to electronic mail. The next 320 pages give information about 190 major networks that are somehow linked to Internet via electronic mail (ranging from sites you have heard of, like America Online, to ones you probably haven't heard of, such as the Hungarian Academic and Research Network). The next 270 pages are a comprehensive listing of email subdomains—listing zillions of company names and their corresponding domain names. (For instance, Apple Computer's domain name is apple.com .) The last few pages include a glossary and a list of electronic mail country codes.

Frankly, most of us don't need this information. Site administrators probably don't need this info, and all but the most curious Internet users can also do without it.

This book, which is thick and heavy and features hares (that's right, hares!) on the cover, looks like it should cost $25 or so. O'Reilly & Associates just lowered the price to $9.95, which is a more reasonable price given the material in it. (O'Reilly & Associates, Inc., 103 Morris St., Suite A, Sebastopol, CA 95472. 1-800-998-9938)

THE BEST GUIDE TO BUSINESS SHAREWARE

Written By: Judy Heim, John Heim, and Mike Callahan
Published By: Osborne McGraw-Hill
List Price: $34.95
Reviewed By: Lenny Bailes

Some people think that the golden days of shareware are gone forever, but this book provides a convincing argument to the contrary. In addition to a basic introduction to the shareware concept and some advice on how to prowl bulletin board systems, the book largely does your prowling for you. There are one-paragraph thumbnails of hundreds of productivity applications, DOS and Windows utilities, indexed

Product Reviews *continued...*

into appropriate chapter divisions. This isn't a rehash of five-year-old stuff that's grown stale in the current era of Windows. Programs like NeoPaint, Graphic Workshop, PC-Flow, FormGen, and others are as useful and powerful as many commercial applications. The review categories range from traditional word processor/spreadsheet/database packages, to project planners, accounting/payroll. Some of the DOS and Windows system utilities covered by the authors are particularly useful: antivirus software, Windows plug-in file managers, file viewers, data recovery, and diagnostic utilities—this is the area where shareware programmers really excel, often providing useful tools that eventually find their way into commercial packages distributed by corporate players. Two 1.4MB diskettes distributed with the book contain a sampling of basic utilities and a telecommunication package to let you do your own BBS prowling.

Coauthor Mike Callahan is a celebrated BBS junkie and shareware connoisseur—well-known in certain circles as "Dr. File Finder." He and the other two coauthors have assembled a volume that can save you many hours of searching for and testing the shareware cream of the crop. (Osborne McGraw-Hill, 2600 Tenth St., Berkeley, CA 94710)

TAKING FLIGHT—HISTORY, FUNDAMENTALS AND APPLICATIONS OF FLIGHT SIMULATION

Written By: Christopher Watkins and Stephen Marenka
Published By: M&T Books
List Price: $29.95
Reviewed By: Kevin Savetz

Flight simulators have always fascinated me. From the first time I played with Flight Simulator II on an Apple II (featuring chunky wire-frame buildings and runways) to the colorful, high-speed animated version that lives on my Mac today, the idea of flying through a simulated world is captivating. Flight simulation buffs will enjoy this book

Taking Flight—History, Fundamentals and Applications of Flight Simulation begins with a short history of (real) flight, and then takes off into a history of flight simulators. It focuses on military applications of flight simulation—"real" flight simulation—rather than the software toys I played with on the Apple computer. Next, the book gets serious, explaining concepts such as fluid mechanics, aerodynamic drag, propellers, rocket engines, and cockpit resource management. *Taking Flight* serves as a good introduction to the basics of flying in real life as well as in virtual space. These subjects can be a bit dry, but authors Watkins and Marenka have made them rather intriguing.

The bulk of the book looks at flight simulators themselves and the theory behind them. Again, the authors pull no punches in explaining concepts from polygon projection and antialiasing to hidden surface removal and simulation of controls and gauges. The accompanying disk includes source code for a simple flight simulation program for PCs and an explanation of how it works.

Although I am disappointed it deals almost entirely with high-end flight simulators rather than

continued on page 206

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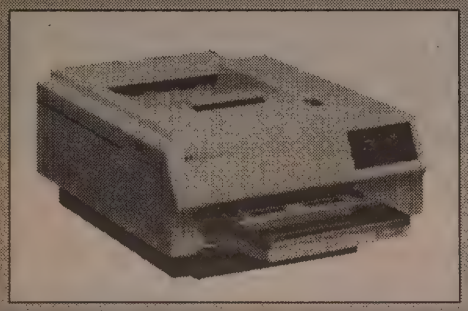

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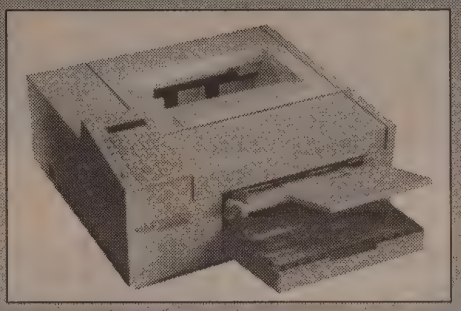

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Product Reviews continued from page 201

more pedestrian ones (like on my Mac), *Taking Flight* provides a detailed look into the history, present and future, of flight simulation, heavy on theory but remarkably readable nonetheless. (M&T Books, a subsidiary of Henry Holt and Co., 115 W. 18th St., New York, NY 10011. 212/886-9200)

USENET: NETNEWS FOR EVERYONE

Written By: Jenny A. Fristrup
Published By: Prentice Hall
List Price: $24.95
Reviewed By: Kevin Savetz

Usenet: Netnews for Everyone, a guide to accessing and using Usenet newsgroups, promises to teach the reader how to "meet and communicate with others who share your interests" and "expand your personal and professional contacts." It only vaguely holds true to these promises.

As is too often the case with Internet books, *Usenet: Netnews for Everyone* combines a modicum of new information with gobs of easily obtained free material. Specifically, the book includes a decent (but short) introduction to Usenet, including info on its community and conventions. But the majority of the book is an enormous listing of Usenet newsgroups and the FAQs that live in each—information that can easily be found online. It also reprints several general Usenet introductions that are available online (for free).

The book doesn't cover some of the most essential basic information. It doesn't touch on how to find a service provider who will feed you Usenet, or how to use rot13 to decrypt text, or how to decode binary files that are so often posted to Usenet.

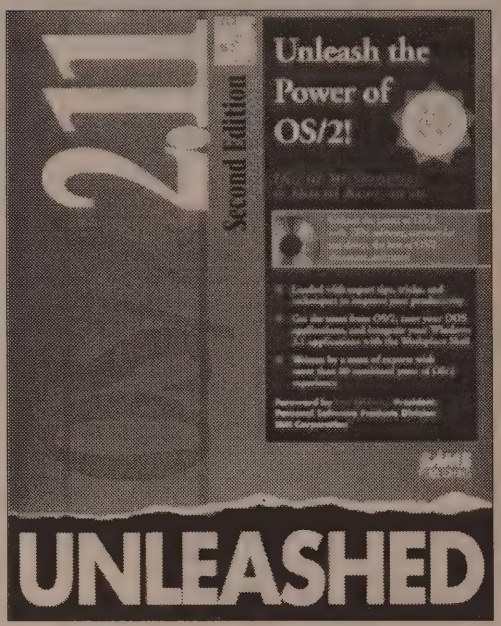
Unfortunately, the best part of the book is the briefest: a list of popular newsreaders (along with descriptions) and command summaries for three programs for reading news. If this book offered more of this type of information rather than rehashed online freebies, it would be worthwhile indeed. (Prentice Hall, 201 W. 103rd St., Indianapolis, IN 46290. 1-800-428-5331)

VIRTUAL PLAYHOUSE FOR MACINTOSH

Written By: Jonathan Price
Published By: Hayden Books
List Price: $39.95
Reviewed By: Kevin Savetz

It's hard to categorize this book: the title, *Virtual Playhouse,* only hints at the breadth of topics covered within. Between the covers of this thick, nearly 800-page tome are hefty chunks of information about everything that's cool about the Macintosh and computing in the '90s.

Virtual Playhouse covers multimedia, animation, fractals, virtual reality, morphing, image processing, games, simulations, and a variety of other tools and toys. The core of the book is a CD-ROM overflowing with demonstrations and working programs for your Mac. The book explains in detail what's on the CD, what you can do with it, and why it's interesting.



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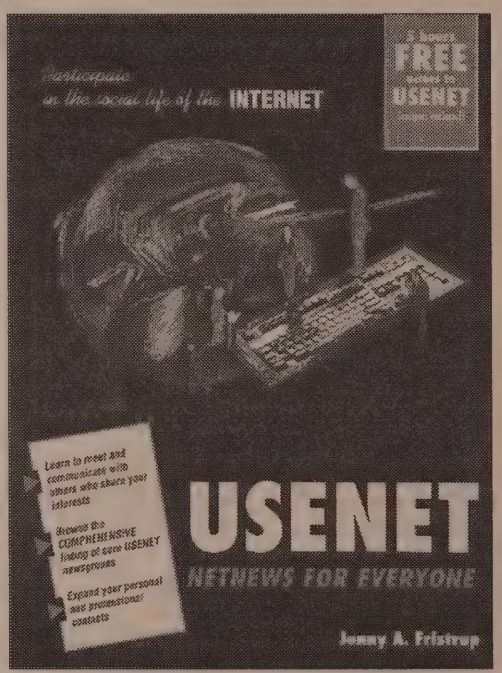

Usenet: Netnews for Everyone

You can find out how to create wild new animals using SimLife, explore the magic of Adobe Photoshop, wander three-dimensional landscapes with Virtus VR, and tweak your desktop design with Wallpaper. While the CD contains crippled versions of most of those commercial software packages, *Virtual Playhouse* provides plenty of useful working tools plus a glimpse into a variety of commercial software. It also reviews multimedia products that aren't on the disc.

After browsing the book, it's back to the disc for hours of fun with QuickTime, Macromedia Director, StudioPro, SoundStudio Lite, Morph, Maelstrom, Chameleon, and about 500MB of other goodies. *Virtual Playhouse* will keep you happily busy. (Hayden Books, 201 W. 103rd. St., Indianapolis, IN 46290. 1-800-428-5331. Email: hayden@hayden.com)

THE VIRTUAL REALITY CASEBOOK

Edited By: Carl Eugene Loeffler and Tim Anderson
Published By: Van Nostrand Reinhold
List Price: $29.95
Reviewed By: Anna Couey

Perhaps now that the "Information Superhighway" has usurped our collective conscious with media hype, we can turn back more thoughtfully to ideas and implications of a technology that has slipped from the limelight and continued to evolve. If you've been wondering what ever happened to VR, or if you're working in the field and curious to know what others are designing, *The Virtual Reality Casebook* provides a refreshingly down-to-earth and thought-provoking survey of virtual reality developments around the world.

The editors are both from the STUDIO for Creative Inquiry at Carnegie Mellon University, which develops virtual reality applications, in particular networked VR. Loeffler's background spans conceptual, media, and electronic arts; Anderson is an art librarian. The *Casebook* reflects their interests—most of the contributors are artists and researchers developing virtual reality projects. The book also includes texts by designers of educational environments and applications for people with disabilities; business applications are at a minimum. It is a design and content book written by practitioners, rather than a technical or purely academic one. You will find discussions of content, the role of agents, how to create suspension of disbelief, and whether the body is obsolete. The *Casebook* is readable and browsable; it contains some thirty-five texts, most no longer than a few pages.

Those who follow VR may be surprised not to see essays by Jaron Lanier, Brenda Laurel, Scott Fisher, and others who are generally viewed as leading practitioners and theorists in the field (though they are referred to in many of the texts). The history of the field and description of the technology involved is rather skimpy. At times, differences between virtual reality technology and computer networks blur in discussions of civil liberties or ethical implications or social dynamics in "cyberspace." But the *Casebook* has no shortage of interesting projects and ideas—as well as surveys of activity in Japan, Germany, and Nordic countries, an extensive annotated bibliography of literature (including online forums discussing virtual reality), and a contact list for companies developing VR applications and tools. It's well worth the price. (Van Nostrand Reinhold, 115 Fifth Ave., New York, NY 10003. 212/254-3232) ■

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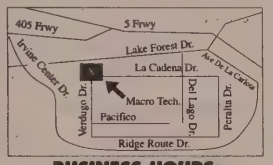

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Sig Kids

continued from page 14

About two hundred kids were chosen to participate, and over one thousand children of SIGGRAPH parent-attendees visited SIGkids this year. High-pitch squeals of laughter occasionally rose above the drone of the crowd. A boy ran up and tugged at his pal's arm, "C'mon, they're doing an interactive story on the MBONE [the multimedia backbone of the Internet], and we're all working on a painting." Kids from all over the US were part of a collaborative networked painting project.

Project Unique

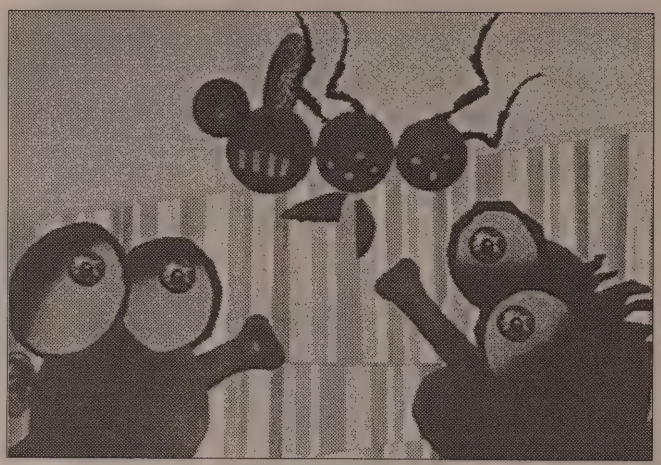
In one of the booths, picture books called, Stories From Our Lives were displayed. The students who created these books attend Rochester, New York's School 36, a diverse elementary school with kids from Central America, Somalia, Yugoslavia, and Russia. Teacher Alicia Van Borsumm worked with the Rochester School District's "Project Unique" director, Karen Wieder and artist-in-residence Stephen Jacobs, to initiate the program designed to teach ESL (English as a Second Language) students about story conceptualization and writing.

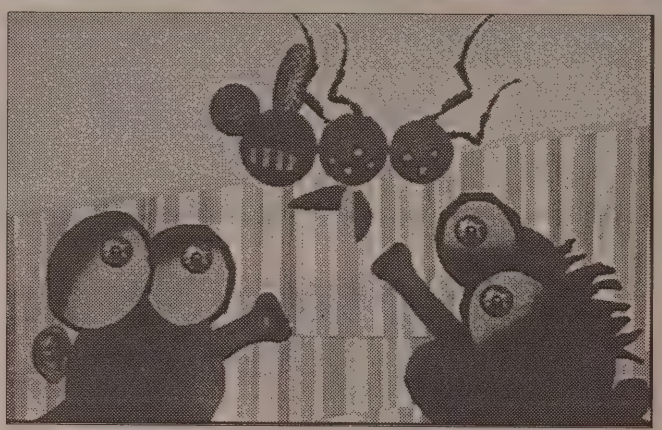
By publishing and creating their own "picture books" the students gained a better understanding of the English language, learned how to use the computer to communicate visually, and improved their writing skills. Alexsandra Yatsushkevech, a girl from Russia, told a story called "Hole in Her Heart," her own story about coming to the United States to have an operation to fix her heart.

The children would first write their stories in longhand, then enter them into the computer where they would edit the story together with their teacher. For the corresponding pictures, they created and printed images using a paint program. Using a HyperCard-like multimedia authoring software package called Kid's Studio, they merged the text with the images and added an audio track. Stephen Jacobs said, "Not only can we teach the kids how to paint on the computer, we teach them how to make two kinds of books: analog and digital, using both the traditional and computer-generated methods of publishing. At the end of the project they have a printed book with a disk sleeve on the back holding the disk of their stories, combining narration, text, and images in the form of QuickTime movies."

Backyard Multimedia

A company called Backyard Multimedia, a new producer of interactive, educational software, sprang from the collaboration with Project Unique. Stephen Jacobs was completing his MFA in animation at the Rochester Institute of Technology at the same time that he was working on this project. He elicited his classmates' help in creating a Macromedia Director stack that consisted of a library of all the students' QuickTime movies, the teachers curriculum for teaching the course, and a documentary of the whole project from start to finish. Jacobs explained, "We have put together this CD-ROM because we know how hard it is for teachers to get technology into their classrooms. This is proof of what can be accomplished by one teacher and it is helpful for teachers seeking financial funding, as it exemplifies the need for investing capital in computers and software. It is also a tangible piece that shows the true educational value of this type of project."





top to bottom: Nick Days logo courtesy Nickelodeon, From the Nick Day "Insect Appreciatioon Day", courtesy Nickelodeon.

Nickelodeon Nick Days

Nickelodeon believes that for kids, every day should be a holiday, so they've created "Nick Days," which are thirty-second promotional spots celebrating a different holiday every day: Eat Blue Food Day, Repeat Repeat Day Day, and so on. At SIGkids this year, each day a different group of kids participated in the production of a new spot. "We are very excited about utilizing the forum of SIGGRAPH to teach interested SIGkids about the rapidly advancing technology in animation," said Scott Webb, senior VP/creative director, Nickelodeon, Nick at Nite.

At the entrance to Nickelodeon's booth sat an easel that outlined the steps in the production process that the kids would follow to create a Nick Day:

1) have a production meeting
2) digitize audio
3) scan artwork
4) cleanup artwork
5) create the animation
6) render the animation and
7) perform off-line editing to mix the sound with the animation

Nick Days animations are created on aMacintosh Quadra 950 using Macromedia Director. Craig Hibbard, of Nickelodeon's art department, was manning the booth and said, "My shoulders are tired from the kids climbing up on them because they get so excited!" He further explains, "I teach the kids about the production process, how to do cut-out, stop-motion puppet animation. This is the method where the legs and arms on a character move separately from the body. They learn about concepts like compositing and anti-aliasing. The cleanup process we do in Adobe Photoshop, after scanning in the images, teaches them how to ensure that color and motion are broadcast legal. They put it all together, drop it into a twenty-six second 'donut' [a pre-existing piece that all the Nick Days start and end with], and finally, at the end of the day, we use Adobe Premiere to make the finished piece: a QuickTime movie, complete with sound." On the following day their production is displayed on a large monitor at the entrance to the SIGkids exhibit.

High School Animators

High School students benefit from teacher Kevin Gouvia's experience as a former television producer. He now teaches at Lyman High School in Longwood, Florida. Gouvia tells his students, "It takes three things to succeed at 2-D cel animation–the three P's: patience, planning, and persistence."

The kids use the Amiga, Video Toaster, Macs, and PCs in their animation process and a wide variety of software packages including Hash Inc.'s Animation Master, Autodesk Animator Pro, Lightwave 3D, and Pixar Typestry.

The students create characters by drawing their movements in pencil onto paper attached to a traditional peg bar setup. This is a registration device, much like a three-hole-punch. Next, they trace these drawings with a digitizer into the computer to create video pencil tests. A video pencil test is a recording of all the drawings in sequence, that when played back tests motion and is used as a tool to see where adjustments in speed and timing need to be made to improve the animation. Student Alex Carcerel sums up the lure of animation quite succinctly by saying, "It's a lot of work but it's all worth it when you see it move."

Recently, one of Gouvia's students, Chad Adams, still a freshman, was taken on as an intern at Metrolight Studios in Orlando, (which recently did the special effects for the movie, *True Lies*). The whole class is currently involved with two projects:

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Sig Kids *continued*

One is a Time-Warner project, and is part of their Navigator system for fiber optic cable. The other is a network interactive game that the class is working on with the Virtual Academy at the University of Central Florida.

OTHER PROJECTS—GOING BEYOND THE CLASSROOM

The topics explored by SIGkids varied widely and were bounded only by the children's imaginations. It was apparent that the new computer technologies were being applied to almost any subject found in the classroom in traditional forms and that the technology and tools themselves seemed to inspire new ways of learning.

Several projects that SIGkids worked on were designed to view the physical world from a global perspective. In GeoMedia, students reviewed a CD-ROM developed by the US Geological Survey and evaluated its effectiveness in teaching students complex concepts visually through animation and hypermedia. They learned by watching animated visualizations of carbon cycles and how human interaction with the earth affects those cycles. They also learned about the greenhouse effect on the earth, and the evolution of living organisms.

SIGkids in the Future Classroom learned about mathematics through a multimedia software adventure that let them explore a place where mathematics played an important role: the building of the Egyptian pyramids.

Modeling Fractal geometry was a project mentored by David Zareski of Cornell University. Fractal Geometry is a popular area of study currently in the science, computer graphics, and artificial life communities. The project taught students, through a course and an interactive exhibit, how fractal geometry and finite automated methods (simple computer program building blocks) can be used to generate models of natural shapes such as plants, snowflakes, ferns, and flowers.

By joining educators with industry mentors the result is innovation in the classroom. By putting the tools of the trade into kids' hands today we are preparing the computer graphics artists, scientists, and technologists of tomorrow. SIGkids is an exciting venue for catching a glimpse of that future. ■

RESOURCES:

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111 East Wacker Dr.
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ACM (Association for Computing Machinery)
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Publicity Coordinator
Shari Hoover
(407)363-3722

Stephen Jacobs
Backyard Multimedia
407 Pearl St.
Rochester, NY 14607
(716)473-0389
Contact Jacobs to order their CD-ROM. They are $7.95 each, the price is to cover manufacturing and distribution costs.

Karen Wieder, Director of Project Unique
131 W. Broad St.
Rochester, NY 14614
(716)262-8207

Kid's Studio
Neill Kramer
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Kevin Gouvia, Florida High School Teacher
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His kids can be reached on the Internet at:
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Adobe Premiere
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Budding Young Animators

continued from page 55

enables you to play the animations back outside of the program at the DOS prompt. Runs under DOS, (Windows launchable) or on the Amiga.

My only real gripe is that both Disney Animation Studio and Hanna-Barbera Animation Workshop have annoyware copy protection schemes. You have to look up pictures and click on the correct one each and every time you enter the program. Maybe kids won't mind this as much as I do.

3D Tutor

It is helpful to learn and understand the basics of 2-D cel animation before embarking into the world of creating 3-D computer animation. There are many similar concepts transferrable from 2-D to 3-D, and it is much easier when you have a solid grasp of working in two dimensions before adding a third. When you are ready to enter the third dimension, or just curious about what you might find there, 3D Tutor is the place to start. 3D Tutor, an interactive multimedia CD-ROM, offers an excellent introduction and tour of the basics of 3-D modeling and animation. It is a wonderful multimedia learning experience rich with images and full of practical production overviews and examples. The glossary has pictures and text, many of which can be interacted with in ways that help further illustrate the concepts. There are product demos and test drives. This is a must-have for learning about 3-D animation. 3D Tutor is well organized, has a sophisticated look and feel, is easy to navigate, and is an excellent learning tool.

Animation—A Hybrid Frontier

The animation process has changed and evolved to stay current with the technology of our time. While many of the tools now used are digital, the same set of innate, manual skills and talents are needed today that were needed in the 1920s when animation first became a burgeoning field. It's likely the animation field will forever require a blend and balance of both hand-drawn images combined with the technology of computers. One of the most discussed issues in the animation industry today is the abundance of technologists and the lack of artists.

To become an animator it takes a combination of hard work, imagination, and talent. It can take years to become proficient. Giving a child who shows promise in this area the direction, guidance, and tools they need to develop those skills can give them a head start on their animation career path. These packages are fun and offer a creative, educational alternative to many types of games.■

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RESOURCES:

Fractal Dabbler, $99
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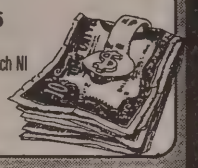

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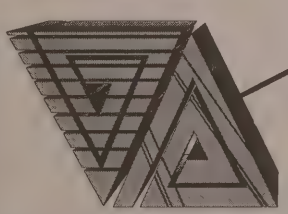

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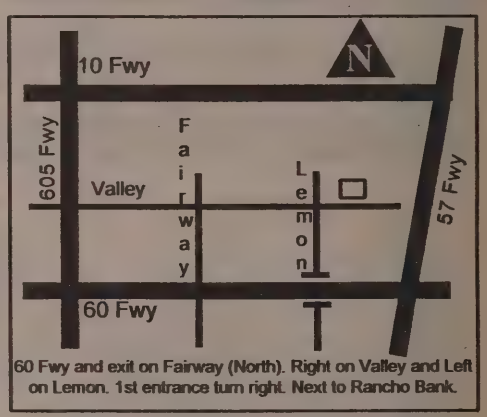

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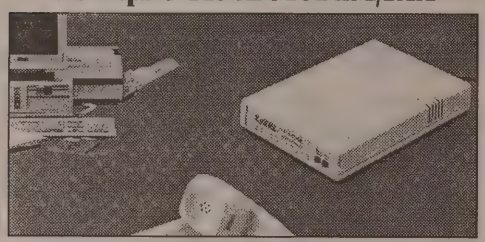

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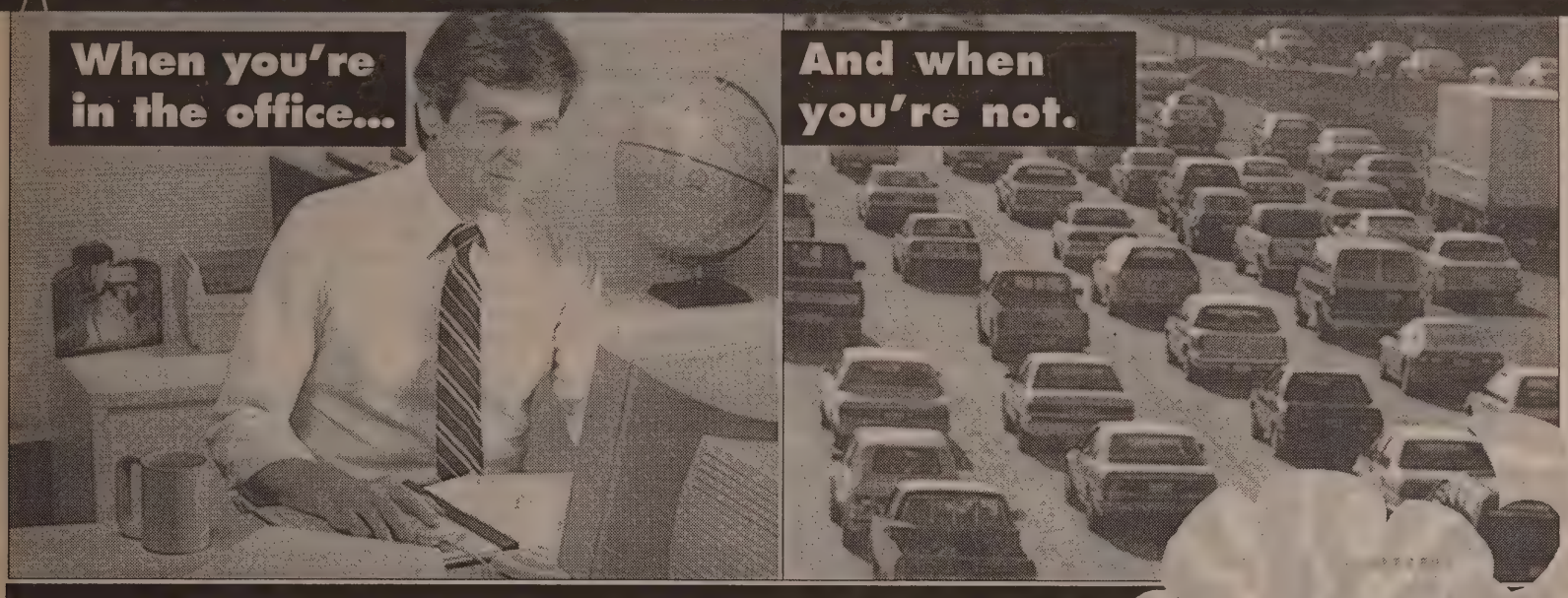

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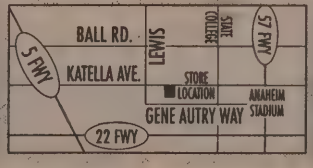

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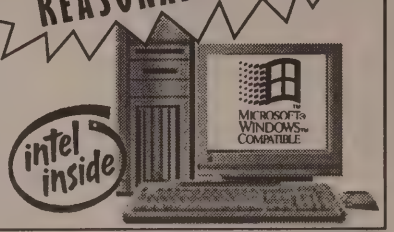

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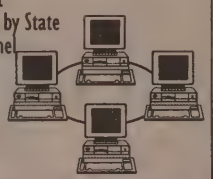

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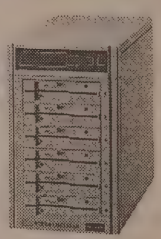

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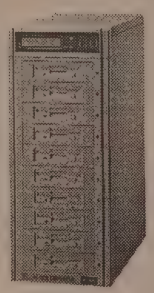

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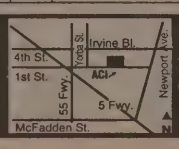

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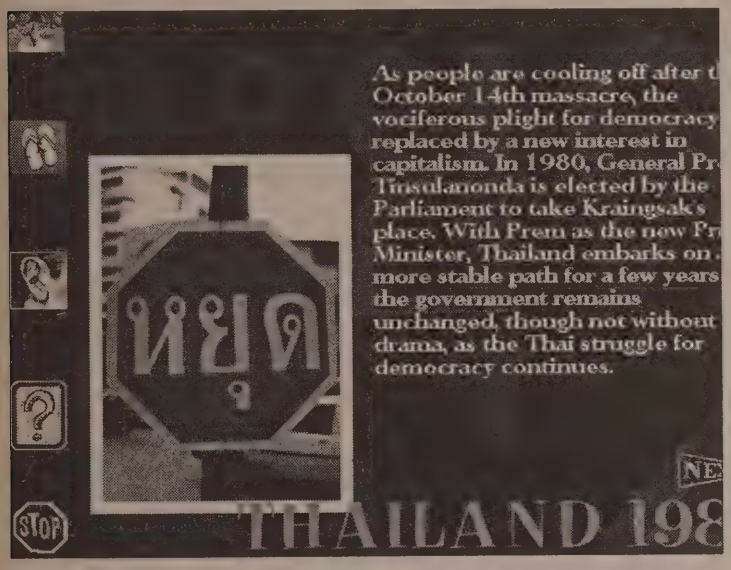
MultiMedia & BEYOND

continued from page 116

This CD-ROM has historical background on the Tarot and can be used for divinations. It was tested by *The Psychic Reader* and positively evaluated.

The cards are the Rider-Waite deck. They are continuously shuffled at high speed and selected at the precise moment you click your mouse, thus being dealt by your own action. You can pick from two interpretations, Arthur Edward Waite's classic from 1910 or a contemporary version by M. L. Foster.


October 14th massacre, the
vociferous plight for democracy
replaced by a new interest in
capitalism. In 1980, General Pr
Tinsulanonda is elected by the
Parliament to take Kraingsak's
place. With Prem as the new Pr
Minister, Thailand embarks on
more stable path for a few years
the government remains
unchanged, though not without
drama, as the Thai struggle for
democracy continues.
หยุด
STOP
THAILAND 198

There is a diary-keeping function so you can check out the system's accuracy over the long term.

I found the new-agey music to be somewhat irritating; I can't believe that it's a replacement for the traditional version; the whole thing runs at a speed that requires contemplation—and yet, I'm curiously impressed. As a sort of weird demonstration of multimedia possibilities, it works—and surely any occultist with a CD-ROM drive would be intrigued. (Virtual Media Works Inc., PO Box 70030, Sunnyvale, CA 94086; 1-800-292-3157: $69.95, Mac and Windows)

VOYAGER

Voyager is perhaps the grand old company of multimedia publishing, having begun operations in 1984. The catalog now includes over forty CD-ROM titles and sixty Expanded Books on floppies as well as development tools and over 150 movies on laserdisc. Currently, there's a big push on to convert titles to Windows format.

Another development is the publication of *3Sixty*, basically Voyager's mail-order catalog, consisting mostly of Voyager's own titles but including the best of the rest. There are generous and reasonably objective descriptions—and, just in case you feel conned, a money-back guarantee. I find it a useful reference book, and you'll find plenty of title descriptions that can't fit in this space. Best of all the press release says that you can get one for free by calling 1-800-446-2001 (although the cover says $2). Otherwise for *3Sixty* or to order titles, you can fax to (914)591-6481, email to orders@3sixty.voyagerco.com, or write the old-fashioned way to Voyager at One Bridge Street, Irvington, NY 10533.

Unfortunately, Voyager's production quality can be a bit rough around the edges. For example, the contents screen of A Hard Day's Night lacks the Scripts section. Adding to the frustration, the printed help for some titles (A Hard Day's Night once again) is skimpy, although the onscreen help is somewhat more complete. You know that movie script is in there somewhere, but how do you find it?

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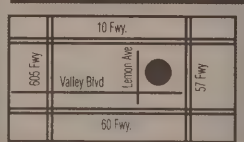

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Another issue to be aware of with the older Voyager titles (or any older titles from any developer) is that once you've seen some QuickTime 2 in a new title, the earlier versions look really small. The tiny QuickTime 1.x window has never been a great way to watch a movie, but it's now almost laughable. And, of course, anything with a HyperCard front end (and many of Voyager's titles have one) is sslloooowww. It is true, however, that the general design of later titles is a distinct improvement over earlier productions.

Having expressed those caveats, if the subject matter is something you or your recipient enjoy, Voyager titles tend to be good quality. A Hard Day's Night ($39.95, Mac and Windows) has some fascinating reading that any Beatles fan should like. Comic Book Confidential ($49.95, Mac only), based on the Ron Mann film, should have similar appeal to anyone interested in comic-book artists.

The Residents Freak Show ($49.95, Mac only at present, Windows very soon) is one of Voyager's best-known titles, and so I was surprised to hear recently that it had only sold three thousand copies. I'll grant you that it's weird and even a little distasteful—but it is a good example of an artistic piece of multimedia where visuals and sound are not only integrated but reinforce each other's impact. Perhaps more importantly, it's also an original concept that could not be done as a collection of traditional media, as A Hard Day's Night and Comic Book Confidential possibly could be. For this reason alone, it should find a place in at least three thousand more disc drives this season.

The Complete Maus ($49.95, Mac only) has problems handling the sound along with its rich graphics, but once more there's such a wealth of material that you just have to overlook the technical shortcomings.

Macbeth ($49.95 Mac only) has an audio-only performance of Shakespeare's play by the Royal Shakespeare Company, along with film clips of versions by Orson Welles, Akira Kurosawa, and Roman Polanski; commentary and analysis; and The Macbeth Karaoke, where you get to play a role opposite the computer. Dramatic content doesn't come any better than Shakespeare, especially when you understand what's going on—this will help you come to grips with the meaning behind the sometimes archaic language.

Morton Subotnik's All My Hummingbirds Have Alibis ($39.95, Mac only) is self-described as "Chamber Music for CD-ROM," but it's a bit more ambitious than that–it's really an intellectual version of HeadCandy. The audio is Red Book, so you can actually play this on a regular CD player or on your CD-ROM drive while you're doing something else on your computer. The music is inspired by Max Ernst's collage novels, and his art is frequently what's on the screen. Other goodies include, of course, Subotnik talking about what he's doing, and following the score as the music plays. The music is avant-gardeish but quite listenable, and includes elements of *au courant* ambience. Highly recommended for the adventurous who want another angle on the music and multimedia connection.

Continuing in the intellectual vein, Voyager's First Person series offers the opportunity to explore the words and thoughts of authors and professors and, in some cases, some of the original sources that they draw from. Stephen Jay Gould's On Evolution ($49.95, Mac only) features a QuickTime lecture from him on Darwinism plus the complete texts of his own *Bully for Brontosaurus* and Darwin's *The Voyage of the Beagle* and *The Origin of the Species*. There are also maps, other historical documents, and loads of graphs and illustrations. All this material is well linked. While this is all rather text intensive, the fonts are well done and reading from the screen is surprisingly easy.

Marvin Minsky's Society of Mind ($49.95, Mac only) has that book along with a few of his articles, plus a very cool QuickTime tour of his living room, a timeline, and various animations.

Donald A. Norman is a designer, and so you might expect his First Person

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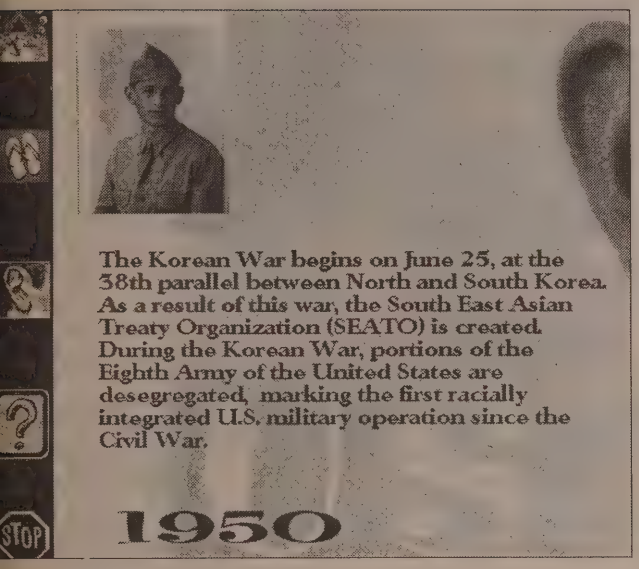
The Korean War begins on June 25, at the 38th parallel between North and South Korea. As a result of this war, the South East Asian Treaty Organization (SEATO) is created. During the Korean War, portions of the Eighth Army of the United States are desegregated, marking the first racially integrated U.S. military operation since the Civil War.
1950
STOP

title, Defending Human Attributes in the Age of the Machine ($49.95 Mac only), to be more ambitious than the previous two—and so it is. He begins with an interesting QuickTime discourse on the design and history of computer screens and continues with a talk about electronic books. There's also the full text of three of his books, *The Design of Everyday Things*, *Turn Signals Are the Facial Expressions of Automobiles*, and *Things That Make Us Smart*, plus the usual other background essays including "The Trouble With UNIX" and "The Trouble With Networks." The Gallery of Unfindable Things is a fascinating full-screen collection of distinctly strange-design non-solutions to problems, complete with his audio commentary.

To round things off, there's a quiz where you get to actually write a little essay. As Norman points out, there's not necessarily a right or wrong answer; the point is to get you to think. Any one with an interest in design, particularly screen design, should get a big kick out of this CD-ROM.

And finally, here's a plain and practical gift suggestion for the Macintosh owner . . .

A lot of things go on under the hood of your Macintosh, many of them humorous and perhaps not particularly official, maybe even clandestine. *Mac & Power Mac Secrets* by David Pogue and Joseph Schorr (IDG Books, $39.95) reveals a fascinating array of those secrets along with all sorts of more mundane knowledge about your Macintosh and how to use it. It comes with three floppies of various goodies. ■

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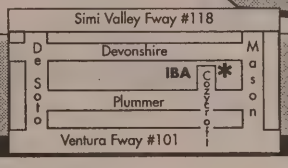

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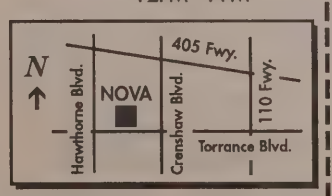

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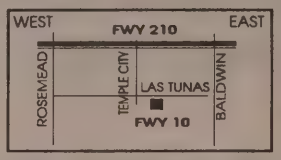

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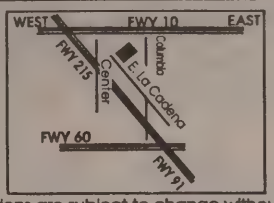

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- Enhanced 101 Keyboard
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- Enhanced 101 Keyboard
- Serial Mouse

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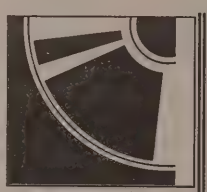

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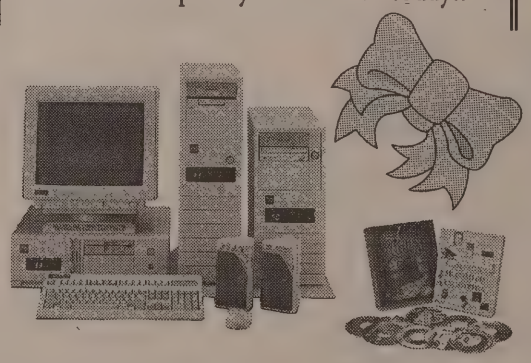

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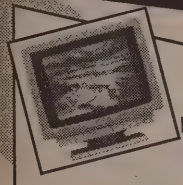

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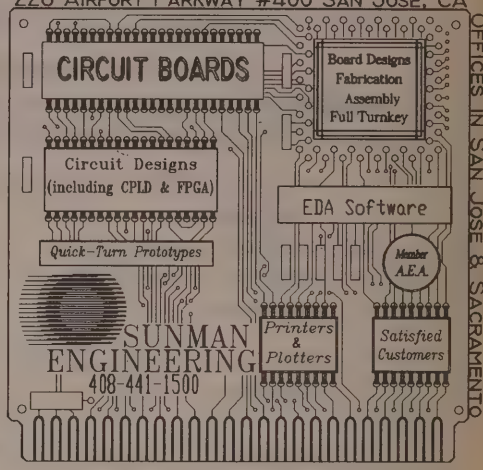

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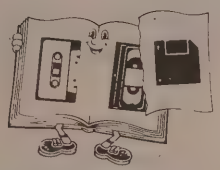

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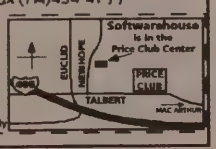

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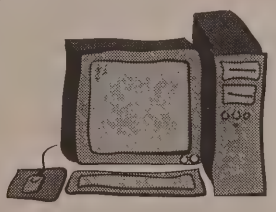

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Jane is a busy woman. Between the job and the kids, she rarely has time to go online for more than a few minutes during the week. On the weekends, she likes to check meet a few friends in group chat for about an hour, but that's all. She uses about 15 hours of online time a month.

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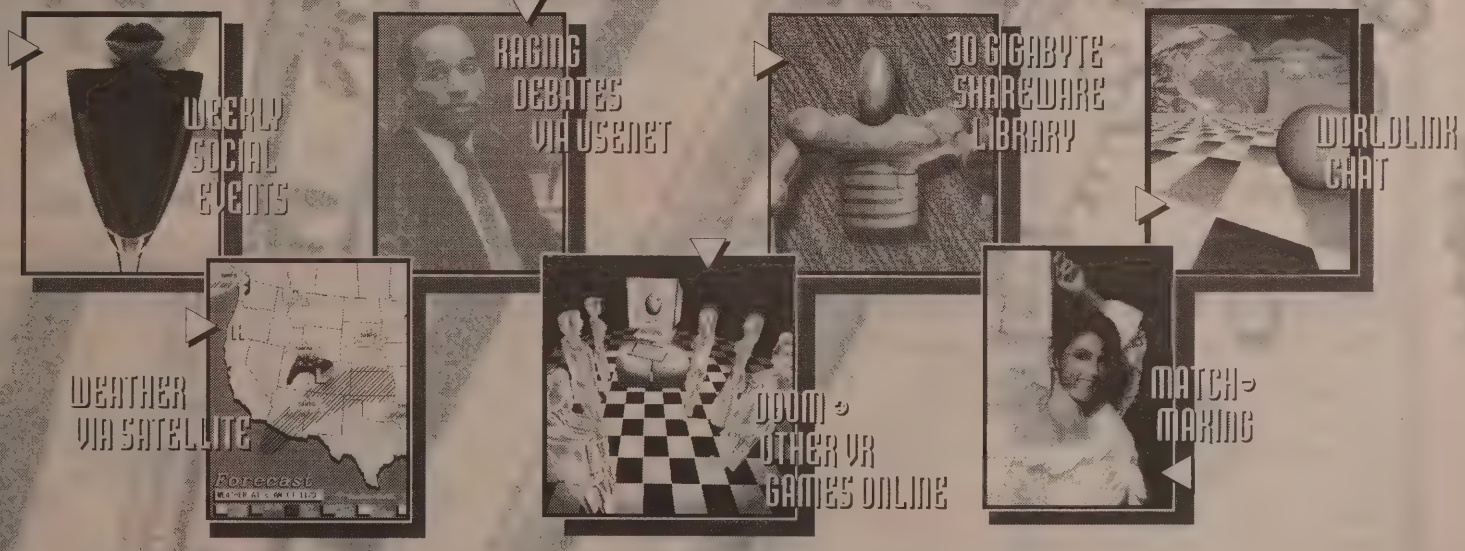

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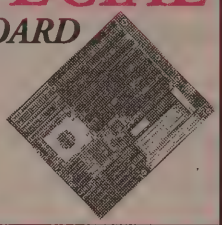

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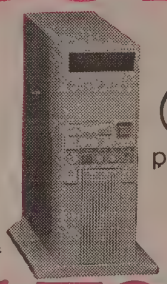

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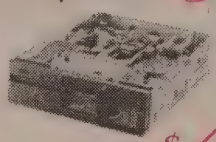

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intel inside

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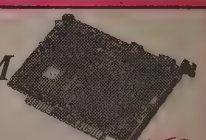

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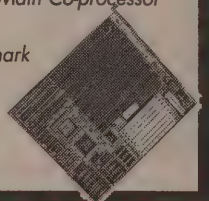

486 VLB GREEN Motherboard

- 256K Cache
- 30 Pin/72 Pin SIMM
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- ZIF Socket
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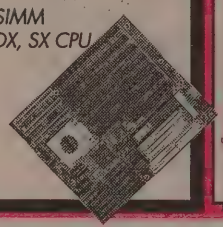

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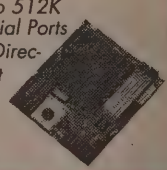

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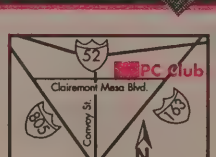

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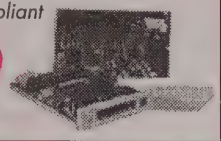

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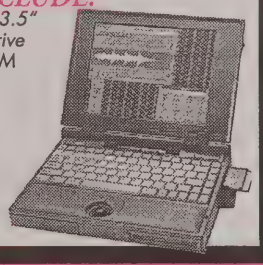

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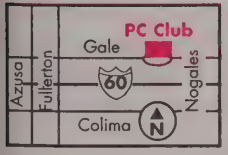

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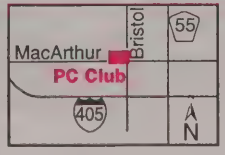

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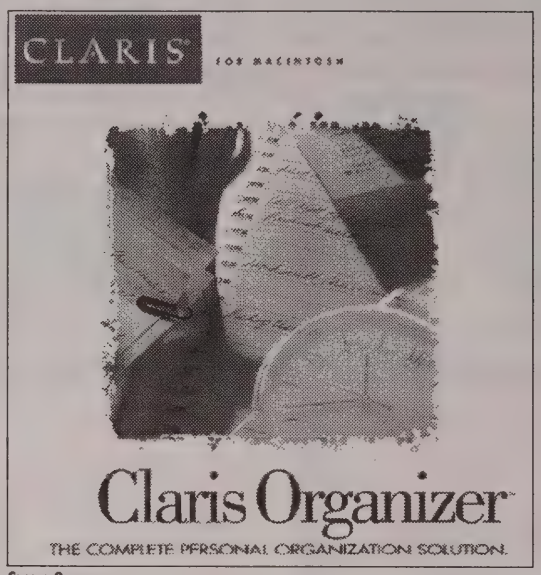
Product Spotlight continued from 174

allows children to build their vocabluary and understanding of new word concepts while expanding upon the learning in prior modes. Availabe in Macintosh and Windows CD-ROM formats. ($39.95; also available is a Teacher's Edition with one CD-ROM and *Teacher's Guide* for $59.95 and a comprehensive lab pack with five CD-ROMs for $119.95) Sanctuary Woods, Inc., 1825 S. Grant St., Suite 410, San Mateo, CA 94402. (415)578-6340.



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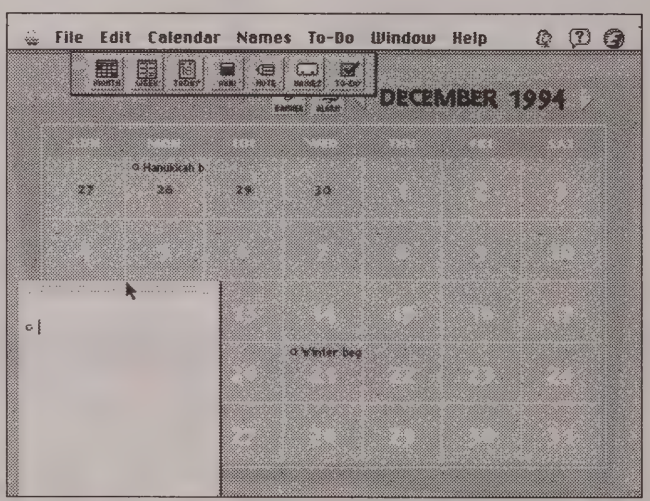
PROJECT USA

Project USA is a DOS-based geography program for children ages eight through twelve. Kids can choose four different activities: 1) The Atlas section lets them customize maps with rivers, mountains, time zones, capitol and major cities, and more; 2) the Compare section lets them compare and print out data on people, government, climate, economy, and resources using maps and graphs; 3) in the Flying Mode, kids fly their own airplane through different time zones, control speed and direction, and turbo-boost their way to their destination; and 4) the Game section is where they will learn interesting city and state information and other fun facts. After earning enough frequent traveler points, kids are promoted to Geomaster and receive a Secret Geomaster Code, which you send in to Impressions. You will then receive a special disk that places your name, school, and state into the program. Your name will be incorporated into future updates of Project USA. ($49.95) Impressions Software, Inc., 222 Third St., Cambridge, MA 02142.



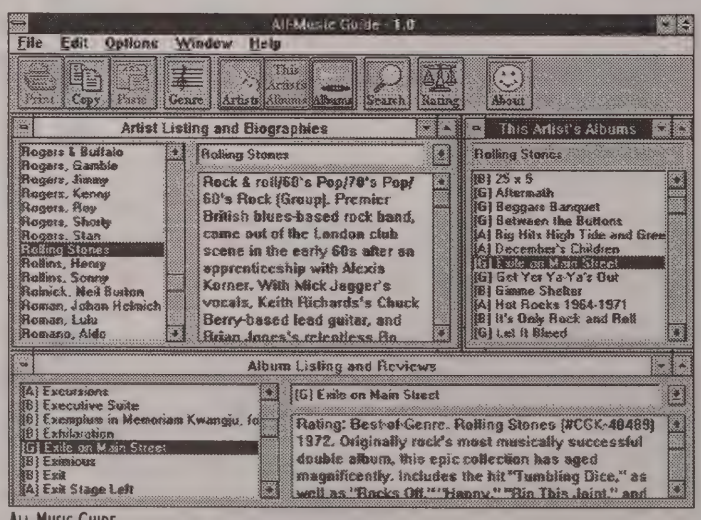
BERKELEY SYSTEMS EXPRESSO

KEROPPI DAY HOPPER

Keroppi Day Hopper is an interactive creative writing journal for children ages seven and older. Featuring Keroppi the Frog, children are drawn into an environment that is not only personalized and secret, but combines a daily, weekly, and monthly view calendar, an inexhaustible journal, and an address book. Each child must log on with their own secret password. Once in the program a child can access the Secret Journal, Calendar, or Address Book. The program is fully integrated with notes from the calendar appearing in the journal as creative writing prompts. Many of the most used vocabulary words produce zany sounds to keep writing fun. Hundreds of environmental and global fun facts appear in the daily calendar. ($54.95) Big Top Productions, Inc., 548 Fourth St., San Francisco, CA 94107. (415)978-5363.

SMITHSONIAN INSTITUTE DINOSAUR MUSEUM

Dinosaur Museum CD-ROM for Windows and Macintosh transforms your computer into a time machine, using sound, lavish color, and interactive games to take you back millions of years ago when dinosaurs ruled the world. Presented by the Smithsonian Institute, with contributions from twenty-four of the world's great museums, Dinosaur Museum brings you dinosaurs of the Triassic, Jurassic, and Cretaceous periods, spanning 160 million years. The Museum Room provides life-like dioramas and exhibit skeletons, plus compete information about the size, classification, behavior, and fossil distribution of various dinosaurs. The Conservatory features exhibits on biology of the Mesozoic Era, extinction theories, myths, Who's Who in dinosaur discoveries, and more. There are also film clips from great movies dating as far back as 1912. Players who score 80% or more in the Game Room can visit the Hall of Fame Room to view one hundred dinosaur photos in full-screen 3-D. ($59.95) Software Marketing Corp., 9860 S. 51st. St., Bldg. A-131, Phoenix, AZ 85044. (602)983-3377.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BRØDERBUND MATH WORKSHOP

Math Workshop offers an entertaining new way for kids ages six to twelve to learn basic math skills and more. Created with help from both educators and kids to investigate math concepts and relate them to the real world, a Parents Video Guide video tutorial is included on the CD-ROM to provide parents with an interactive, guided tour of current trends in math education and suggested learning activities. Math Workshop, available for both MPC

Product Spotlight

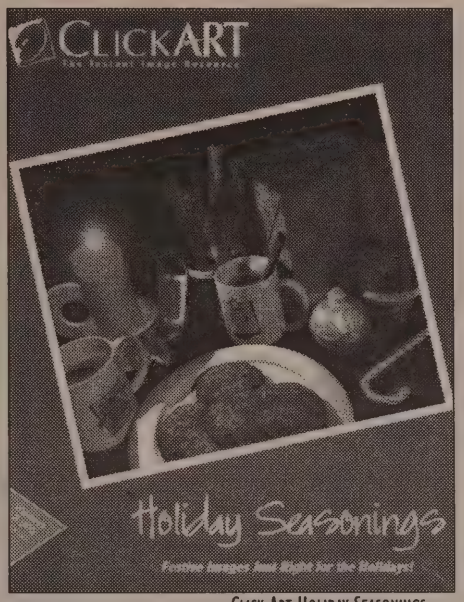
Windows and Macintosh computers, makes math fun in seven different areas and includes numerous games and puzzles with playful, animated characters such as Gus the Bowling Gorilla. The program offers kids of varying abilities and ages plenty of activities so that the program grows with them. ($40) Brøderbund Software, Inc., 500 Redwood Blvd., PO Box 6121, Novato, CA 94948-6121. (415)382-4400.

BRØDERBUND KID PIX STUDIO

Kid Pix Studio CD-ROM is a new paint and animation program that helps kids ages three to twelve to create their own multimedia paintings, animations, movies, and stories on a Macintosh. In addition to more than double the number of original Kid Pix painting tools, Kid Pix Studio offers new animation projects designed by the original Kid Pix creator Craig Hickman. Other new features include Stampscapes to create colorful background graphics that can be used in drawings, slide shows, and movies, and Musical Sounds with over eighty musical and environmental sound effects that kids can use to enliven animations. ($45) Brøderbund Software, Inc., 500 Redwood Blvd., PO Box 6121, Novato, CA 94948-6121. (415)382-4400.

SNOOPY'S GEOGRAPHY GAMES

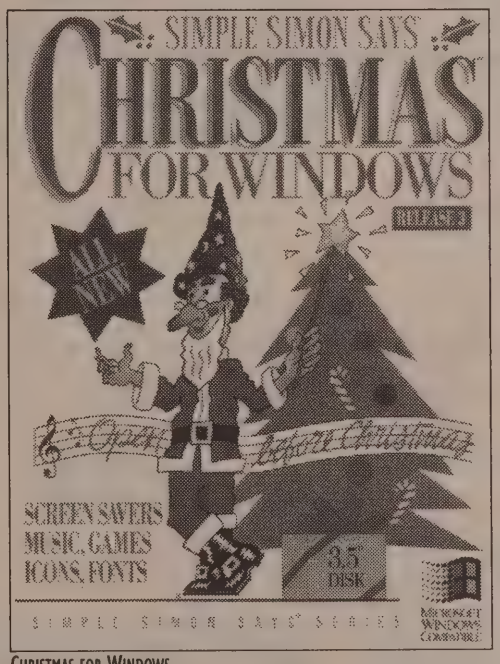
Snoopy's Geography Games is the latest title from Image Smith's interactive educational software series featuring Charles Shultz's Peanuts characters. Throughout the program, Snoopy is the guide that lets a child travel easily between five different games. The Great Country Shoot, a circus-like game, challenges the player to shoot each of the Peanuts characters out of a canon to land on the country the narrator asks the player to locate by spinning the globe. In the Driving Game, children navigate Snoopy through a maze to learn the best route to take to get to a destination. The Compass Game helps children decipher compass directions. Snoopy becomes your host in the game show-like GeoParty. Finally, in Snoopy's Adventure Journal a voice narrates Snoopy's personal journal of his worldwide adventures. ($19.95. Available for both Macintosh and PC, on floppy disks and CD-ROM) Image Smith, Inc., 1313 W. Sepulveda Blvd., Torrance, CA 90501. 1-800-U-SNOOPY.



Click Art Holiday Seasonings

MS. WINKLE'S CLASS

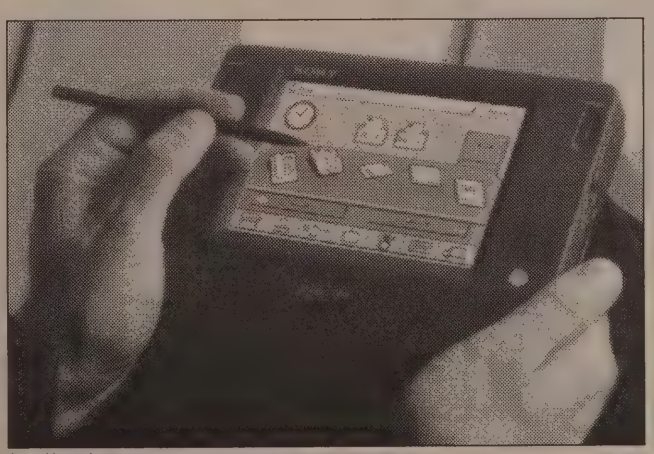
Ms. Winkle's Class, a CD-based learning adventure for Windows, creates an interactive classroom where users ages six to ten can enjoy exploring and sharing the class, daydreams, and even joke with the students in the class. Although children will learn and explore in a setting that is like a real classroom, the learning adventure really takes off with the daydreams of three students. One by one their imaginations run away with them, but Ms. Winkle is never far behind. Their lessons become amazing adventures. ($39.95) Abudoe Software, Inc., 320 108th Ave. N.E., Suite 500, Bellevue, WA 98004. (206)462-8303.



Christmas for Windows

SPELL DODGER! FOR WINDOWS

Spell Dodger! for Windows helps children ages six to fourteen build fundamental spelling skills in an arcade-style maze game. It offers multiple levels of difficulty and five hundred combinations to provide unlimited game play. The software also features animations, 256-color graphics, and digitized sound effects. Students help Spell Dodger navigate his way up and down ladders and across platforms without being captured by crawling and flying monsters. As players move through the maze, they collect tokens to earn the chance to correctly spell a word and advance to another round of play. After gathering letter tokens, players have the opportunity to increase their scores by answering spelling and vocabulary problems including multiple choice, complete-the-sentence, sound-to-spell, scrambled words, and definition questions. Players can track their improvement by comparing scores in the Legion of Honor. Macintosh version is also available. ($35; also available in lab packs for $99.95 and site licenses for $499.95) Davidson & Associates, Inc., 19840 Pioneer Ave., Torrance, CA 90503. (310)793-0600.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VLB IDE w/I/0 4HD/4FD	45
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Conner 525MB SCSI Int.	449

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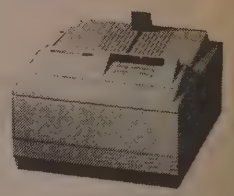
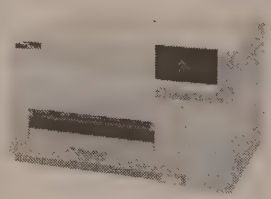
HP LASERJET 4V LASER PRINTER

Do it in double time! This new LaserJet printer features a resolution of 600 dpi and prints at 16 pages-per-minute using a 33-MHz RISC processor, making it the fastest LaserJet printer! The LaserJet 4V also features the ability to print on wide-format 11" x 17" paper, making this printer the perfect choice for CAD/Design professionals.



CALL!

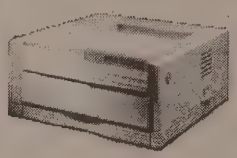
HP COLOR LASERJET PRINTER



Presenting a colorful sequel to the most popular laser printers in history. Introducing the HP Color LaserJet printer! Featuring eight full colors and millions of halftone colors, this high quality printer uses direct-to-drum imaging for exceptional print registration. Fast color printing at up to 2 pages-per-minute or up to 10 pages-per-minute in basic black.

$CALL!

HP LASERJET 4P LASER PRINTER

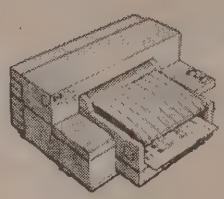


The HP LaserJet 4P Printer features true 600 x 600 dpi printing. Plus, this compact printer comes with 45 built-in scalable typefaces, enhanced HP PCL5 for seamless compatibility with the HP LaserJet 4 printer, and 2 MB of standard memory (expandable to 26MB).

$915.00

HP DESKWRITER / DESKJET 560C INKJET PRINTER

Using an advanced color printing system with HP's exclusive built-in ColorSmart technology, the new DeskJet / DeskWriter 560C delivers optimal color output. Also features resident dual cartridges for convenient black-and-color printing at the same time, clear 600 x 300 dpi black printing, and a variety of internal and scalable fonts!



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HP SCANJET IICX COLOR SCANNER

The HP ScanJet IIcx color scanner is the complete solution for true 24-bit color, grayscale and text scanning. Featuring an optical resolution of 400 dpi, the ScanJet IIcx can also process images at up to 1600 dpi using enhanced resolution technology!

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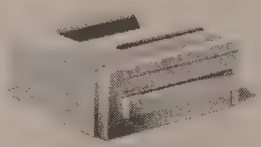
HP LASERJET 4L LASER PRINTER



This 300 dpi laser printer is HP's lowesr priced LaserJet ever. In addition to it's sharp looking output, the LaserJet 4L has an incredibly small 14" by 14.5" footprint; the perfect fit for your desk or shelf. Plus, it comes equipped with 26 built-in scalable fonts for professional quality documents.

$525.00*

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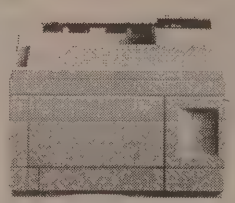
HP LASERJET 4 PLUS LASER PRINTER



Featuring incredible **600 dots-per-inch output with a *new 12 page-per-minute print engine***, the new HP LaserJet 4+ is the fastest 600 dpi printer on the market! Plus, 45 internal scalable typefaces and 2MB of standard memory (expandable to 32MB).

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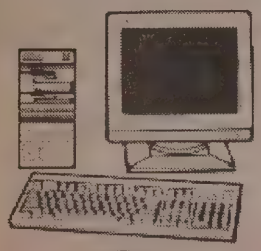

COMES COMPLETE WITH:

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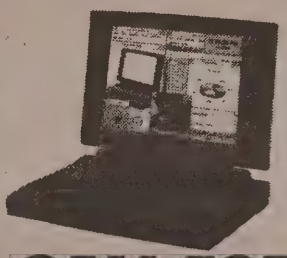
intel inside

$1159.00

GST AAPOGEE NOTEBOOK COMPUTER



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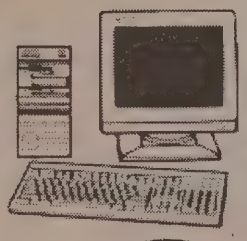

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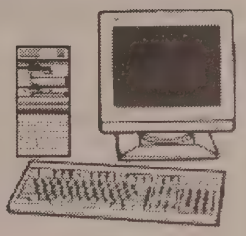

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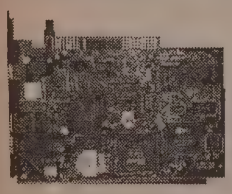
E-TECH BULLET FAX/MODEM



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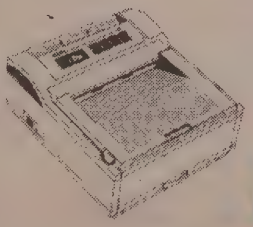

Equipped with 44 built-in fonts, this printer produces great looking output at 300 dpi. It's compact size and sleek design makes it fit comfortably on any desktop, plus it's compatible with virtually all software applications!

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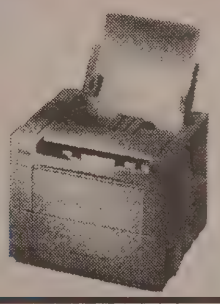
The EPSON ActionLaser 1100 laser printer features a printing resolution of 300 dpi, with a 4 page-per-minute print engine. Plus, it also includes 22 fonts! This is the least expensive true laser printer on the market!



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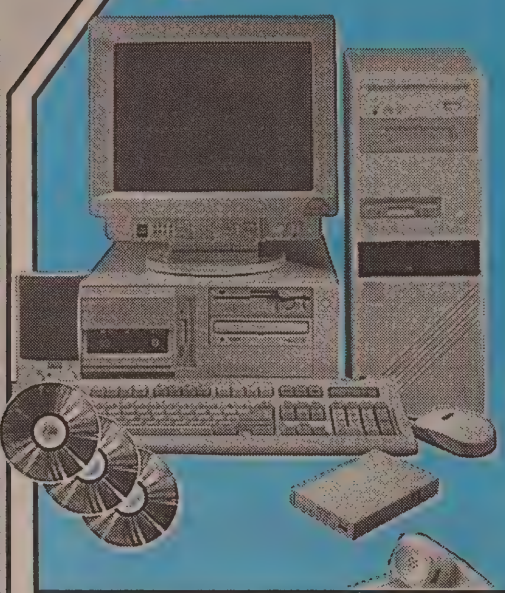

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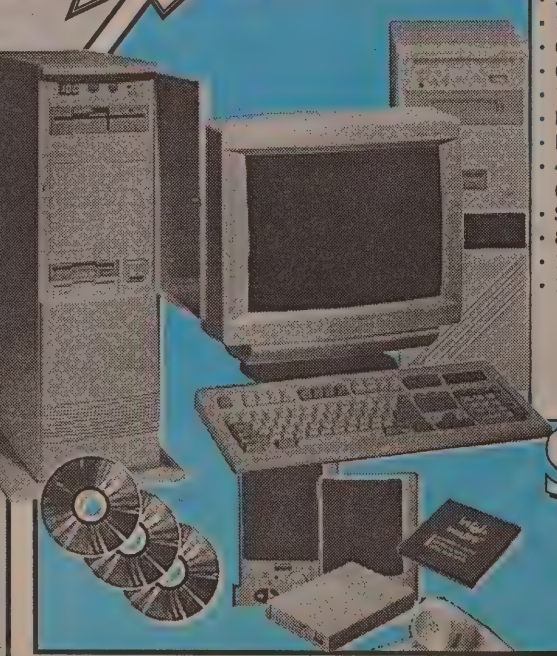

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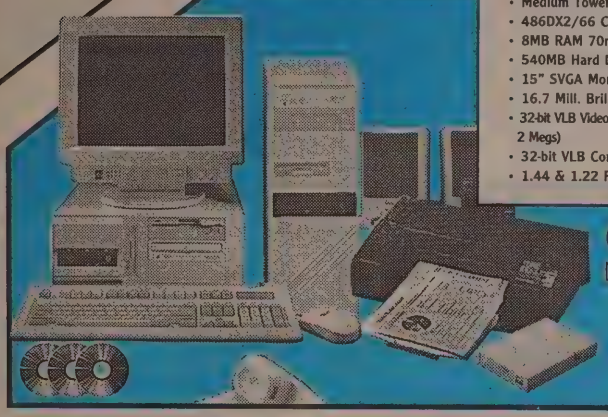

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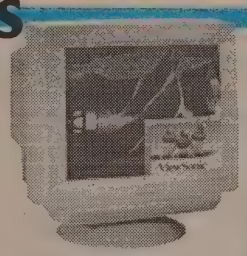

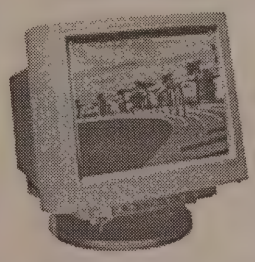

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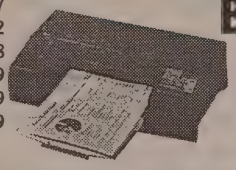

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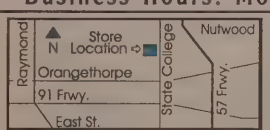

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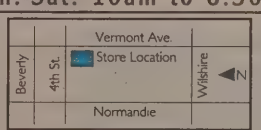

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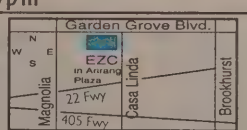

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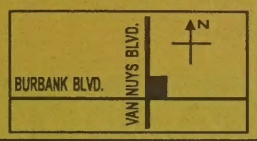

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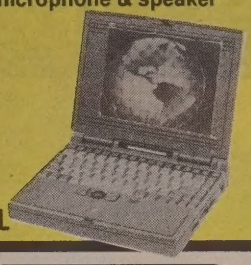

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Dvorak's Guide To Urban Folklore, Part 2

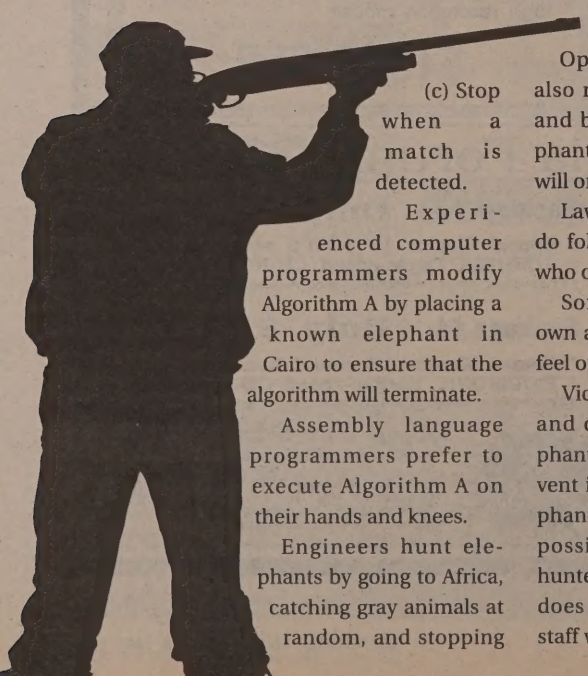
Elephant Hunters And Computer Professionals

The following piece is an absolute folklore classic. It has all the elements of an item to post on the bulletin board. Apparently this piece has shown up on many online humor forums in various forms throughout the last few years. Very funny.

Telling A Person's Profession By The Way They Hunt Elephants

Computer scientists hunt elephants by exercising Algorithm A:

1. Go to Africa.
2. Start at the Cape of Good Hope.
3. Work northward in an orderly manner, traversing the continent east and west.
4. During each traverse pass,
   (a) Catch each animal seen,
   (b) Compare each animal caught to a known elephant,
   (c) Stop when a match is detected.



Experienced computer programmers modify Algorithm A by placing a known elephant in Cairo to ensure that the algorithm will terminate.

Assembly language programmers prefer to execute Algorithm A on their hands and knees.

Engineers hunt elephants by going to Africa, catching gray animals at random, and stopping when any one of them weighs within + or - 15% of any previously observed elephant.

Mathematicians hunt elephants by going to Africa, throwing out everything that is not an elephant, and catching one of whatever is left.

Experienced mathematicians will attempt to prove the existence of at least one unique elephant before proceeding to step 1 as a subordinate exercise.

Professors of mathematics will prove the existence of at least one unique elephant and then leave the detection and capture of an actual elephant as an exercise for their graduate students.

Economists don't hunt elephants, but they believe that if elephants are paid enough, they will hunt themselves.

Consultants don't hunt elephants, and many have never hunted anything at all, but they can be hired by the hour to advise those people who do.

Operations research consultants can also measure the correlation of hat size and bullet color to the efficiency of elephant-hunting strategies, if someone else will only identify the elephants.

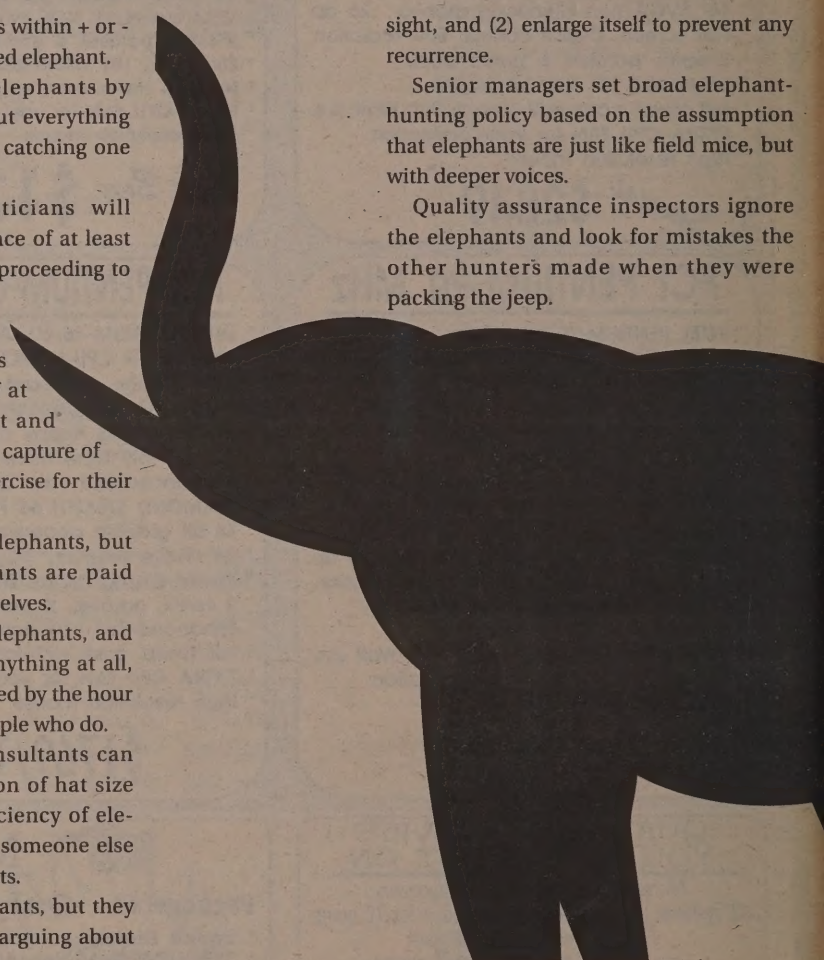
Lawyers don't hunt elephants, but they do follow the herds around arguing about who owns the droppings.

Software lawyers will claim that they own an entire herd based on the look and feel of one dropping.

Vice presidents of engineering, research, and development try hard to hunt elephants, but their staffs are designed to prevent it. When the VP does get to hunt elephants, the staff will try to ensure that all possible elephants are completely prehunted before the VP sees them. If the VP does see a non-prehunted elephant, the staff will (1) compliment the VP's keen eyesight, and (2) enlarge itself to prevent any recurrence.

Senior managers set broad elephant-hunting policy based on the assumption that elephants are just like field mice, but with deeper voices.

Quality assurance inspectors ignore the elephants and look for mistakes the other hunters made when they were packing the jeep.



Salespeople don't hunt elephants but spend their time selling elephants they haven't caught, for delivery two days before the season opens.

Software salespeople ship the first thing they catch and write up an invoice for an elephant.

Hardware salespeople catch rabbits, paint them gray, and sell them as desktop elephants. ■

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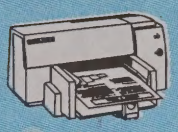

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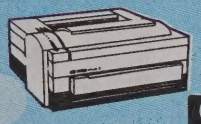

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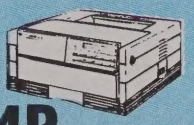

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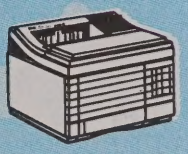

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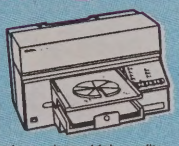

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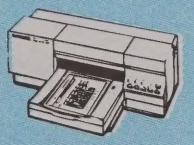

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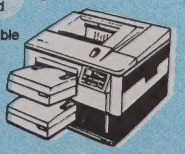

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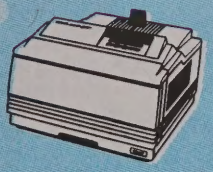

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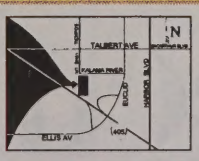

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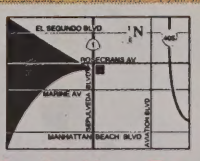

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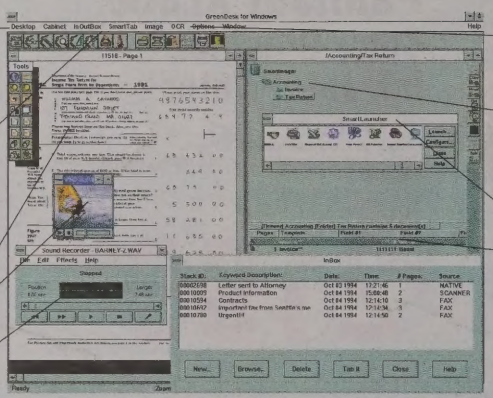

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